Vol. 988 Number 4

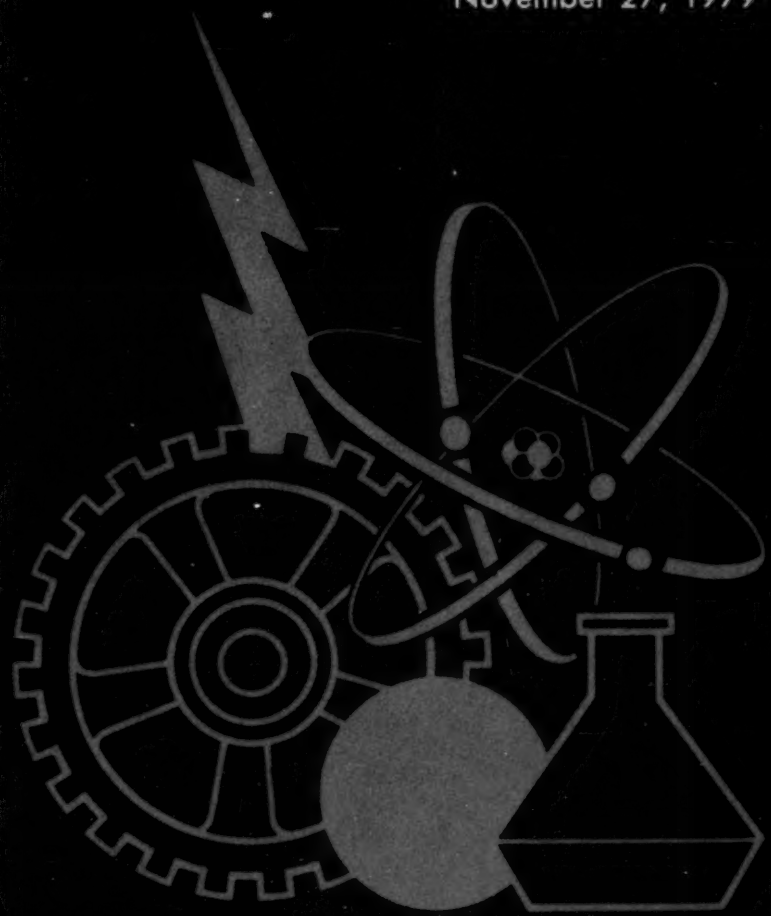
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

November 27, 1979



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 27, 1979 Volume 988 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT, including the amounts of the fees thereunder and the States that may be designated in international applications, consult the notice entitled "Update of information concerning the Patent Cooperation Treaty" appearing in the OFFICIAL GAZETTE of July 3, 1979.

Effective August 1, 1979 the international fees are increased to the following amounts:

Basic fee under PCT Rule 15.1(i) for an international application containing 30 sheets or less	$190.00
Supplemental fee to the Basic fee for each page of an international application in excess of 30 sheets	3.50
Designation fee under PCT Rule 15.1(ii)	45.00

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

July 3, 1979.

Board of Appeals Decisions Rendered in the Month of October 1979

Affirmed	205
Affirmed in part	30
Reversed	80
Total	315

Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commission of Patents and Trademarks on or before Dec. 21, 1979:

Annett, Leonard L., Suite 2900, 2 Bloor St., East Toronto, Canada M4W 3J5

Cooper, William C., 4421 Lowell St., NW., Washington, D.C. 20016

Cutting, Robert F., 2111 Jefferson Davis Hwy., #1123N, Arlington, Va. 22202

Frenkel, Stuart D., 2000 S. Eads St., #906, Arlington, Va. 22202

Goodman, Philip, 307 Yoakum Pkwy., Alexandria, Va. 22304

Haley, Reuben J., Northern Telecom Ltd., P.O. Box 3511, Sta. C, Ottawa, Ontario, Canada K1Y 4H7

Parr, Eugenia S., 6842 Cerro Bajo, San Antonio, Tex. 78239

Schwartz, Gerald A., 606 W. Windsor Ave., Alexandria, Va. 22302

Wiggs, Blake R., Suite 280, One Bentall Centre, 505 Burrard St., Vancouver, British Columbia, Canada V7X 1M3

LUTRELLE F. PARKER,
Chairman, Committee on Enrollment.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,256,002, Re. S.N. 066,886, Filed Aug. 16, 1979, Cl. 118/60, XEROGRAPHIC FIXING DEVICE, Frederick W. Hudson, Owner of Record: *Xerox Corporation, Rochester, N.Y.,* Attorney or Agent: Harvey M. Brownrout, Ex. Gp.: 166

3,312,548, Re. S.N. 066,889, Filed Aug. 16, 1979, Cl. 96/1.5 R, XEROGRAPHIC PLATES, Virgil E. Straughan, Owner of Record: *Xerox Corporation, Rochester, N.Y.,* Attorney or Agent: Harvey M. Brownrout, et al., Ex. Gp.: 166

3,870,515, Re. S.N. 066,888, Filed Aug. 16, 1979, Cl. 96/1.4, METHOD FOR ELECTROSTATIC PAPER STRIPPING BY NEUTRALIZATION OF TRANSFER CHARGE, Norbett H. Kaupp, Owner of Record: *Xerox Corporation, Rochester, N.Y.,* Attorney or Agent: Harvey M. Brownrout, et al., Ex. Gp.: 166

4,060,003, Re. S.N. 065,967, Filed Aug. 13, 1979, Cl. 73/483, IMBALANCE DETERMINING APPARATUS AND METHOD, Thomas J. Bacsanyi, et al., Owner of Record: *Ransburg Corporation, Indianapolis, Ind.,* Attorney or Agent: Merrill N. Johnson, et al., Ex. Gp.: 244

4,061,279, Re. S.N. 065,825, Filed Aug. 13, 1979, Cl. 241/86.1, HIGH-SPEED ROTATING CRUSHING MACHINERY, Daniel C. Sautter, Owner of Record: *Pennsylvania Crusher Corp., Broomall, Pa.,* Attorney or Agent: Elliott I. Pollock, et al., Ex. Gp.: 322

4,083,545, Re. S.N. 062,536, Filed Jul. 31, 1979, Cl. 267/54 A, SPRING SHACKLE ASSEMBLY, Edward J. Herbenar, Owner of Record: *TRW Inc., Cleveland, Ohio,* Attorney or Agent: Thomas L. Tarolli, et al., Ex. Gp.: 315

4,101,861, Re. S.N. 063,644, Filed Aug. 3, 1979, Cl. 337/368, THERMOSTATIC SWITCH AND METHOD OF ASSEMBLY, Richard L. Jenne, Owner of Record: *Texas Instruments Incorporated, Dallas, Tex.,* Attorney or Agent: John A. Haug, et al., Ex. Gp.: 212

4,147,558, Re. S.N. 067,865, Filed Aug. 20, 1979, Cl. 134/10, METHOD FOR RINSING AND CHEMICALLY SANITIZING FOODWARE ITEMS, Louis F. Fraula, et al., Owner of Record: *Hobart Corporation, Troy, Ohio,* Attorney or Agent: Lawrence B. Biebel, et al., Ex. Gp.: 173

4,147,559, Re. S.N. 067,866, Filed Aug. 20, 1979, Cl. 134/57 D, APPARATUS FOR RINSING AND CHEMICALLY SANITIZING FOOD WARE ITEMS, Louis F. Fraula et al., Owner of Record: *Hobart Corporation, Troy, Ohio,* Attorney or Agent: Lawrence B. Biebel, et al., Ex. Gp.: 247

PATENT NOTICES

Certificates of Correction for the Week of Nov. 27, 1979

Re. 29,892	4,103,051	4,142,806	4,159,233
Re. 30,010	4,108,248	4,142,937	4,159,280
D. 252,211	4,109,200	4,144,033	4,159,311
D. 252,488	4,109,202	4,144,465	4,159,381
D. 252,498	4,109,280	4,144,720	4,159,700
3,878,202	4,114,841	4,145,710	4,159,884
3,919,293	4,115,290	4,146,040	4,159,995
3,927,383	4,116,793	4,146,471	4,159,997
3,930,980	4,116,794	4,146,578	4,159,998
3,944,926	4,116,856	4,148,840	4,160,028
3,960,857	4,116,857	4,150,279	4,160,582
3,984,200	4,116,858	4,151,152	4,160,672
4,004,647	4,120,175	4,152,413	4,160,850
4,005,073	4,120,395	4,152,415	4,161,014
4,005,110	4,120,625	4,153,722	4,161,125
4,012,429	4,121,900	4,153,883	4,161,261
4,019,947	4,124,149	4,154,838	4,161,458
4,021,427	4,126,096	4,154,883	4,161,492
4,021,846	4,127,205	4,155,241	4,161,807
4,026,959	4,127,231	4,155,697	4,161,868
4,028,724	4,128,602	4,155,882	4,162,163
4,029,692	4,128,603	4,156,091	4,162,237
4,033,565	4,130,709	4,156,092	4,162,377
4,038,272	4,130,812	4,156,541	4,162,475
4,038,616	4,131,393	4,156,569	4,162,859
4,045,317	4,131,951	4,156,788	4,163,889
4,054,973	4,132,349	4,156,893	4,164,417
4,074,133	4,133,009	4,157,124	4,164,454
4,078,810	4,133,015	4,157,231	4,164,964
4,083,398	4,133,733	4,157,293	4,165,295
4,087,834	4,133,970	4,157,340	4,165,304
4,090,006	4,134,398	4,157,390	4,165,639
4,091,138	4,134,788	4,157,392	4,166,285
4,092,983	4,135,133	4,157,572	4,166,991
4,093,763	4,136,659	4,158,279	4,167,277
4,095,732	4,137,964	4,158,660	4,167,326
4,095,795	4,138,595	4,158,690	4,167,346
4,097,461	4,140,270	4,158,815	4,167,519
4,098,904	4,140,977	4,158,863	
4,099,658	4,142,656	4,159,014	

Disclaimers

3,328,594.—*Edward E. Sheldon*, New York, N.Y. INSPECTING APPARATUS USING FIBER OPTICS. Patent dated June 27, 1967. Disclaimer filed Apr. 30, 1979, by the inventor.

The term of this patent subsequent to Oct. 18, 1983 has been disclaimed.

3,437,747.—*Edward Emanuel Sheldon*, New York, N.Y. DEVICES FOR INSPECTION USING FIBEROPTIC MEMBERS. Patent dated Apr. 8, 1969. Disclaimer filed Apr. 30, 1979, by the inventor.

The term of this patent subsequent to Oct. 18, 1983 has been disclaimed.

3,788,748.—*Lindsay Charles Knight, Colin Maxwell Finch*, Albury, N.S.W., *Noel Harry Fred Walden*, Southport, *George Racz*, Albury, N.S.W., Australia. INDICATING THE PASSING OF A PROJECTILE THROUGH AN AREA IN SPACE. Patent dated Jan. 29, 1974. Disclaimer filed Sept. 19, 1979, by the assignee, *Australasian Training Aids Proprietor Limited*.

Hereby enters this disclaimer to claims 16, 17, 20 and 29 of said patent.

4,138,362.—*Anthony E. Vassiliades*, Deerfield, and *Cheng H. Chang*, Naperville, Ill. FORMATION OF MICROCAPSULES BY INTERFACIAL CROSS-LINKING, MICROCAPSULES PRODUCED, AND MICROCAPSULAR DISPERSION. Patent dated Feb. 6, 1979. Disclaimer filed Sept. 24, 1979, by the assignee, *Champion International Corporation*.

Hereby enters this disclaimer to claims 13–15 of said patent.

Dedications

3,906,786.—*Carl M. Westbrook*, Beloit, Wis. OVERLOAD PROTECTOR FOR TORQUEMETER. Patent dated Sept. 23, 1975. Dedication filed Sept. 4, 1979, by the assignee, *Dana Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

4,129,674.—*George J. Hannes*, Maumee, *Theodore K. Rohweder* and *Hans W. Dreikorn*, Toledo, Ohio, and *Philip B. Shepherd*, Sedalia, Colo. FIBROUS MAT ESPECIALLY SUITABLE FOR ROOFING PRODUCTS AND A METHOD OF MAKING THE MAT. Patent dated Dec. 12, 1978. Dedication filed Sept. 17, 1979, by the assignee, *Johns-Manville Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator,
National Technical Information Service.

DEPARTMENT OF THE ARMY, OTJAG
Chief, Intellectual Property Division, Room 2D 444
Pentagon, Washington, D.C. 20310

Patent application 950,501, Fire-Safe Hydrocarbon Fuels. Filed Oct. 11, 1978. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St. SW., Washington, D.C. 20324

Patent application 6–011,585. Multiple-Invariant Space-Variant Optical Processing. Filed Feb. 12, 1979.

Patent application 6–017,624. Mouth Mounted Accelerometer Pack. Filed Mar. 5, 1979.

Patent application 6–017,626. Precision Fir Indexing Device for Wind Tunnel Models. Filed Mar. 5, 1979.

Patent application 6–018,697. Automatic Data Restore Apparatus for MNOS Temporary Store Memory. Filed Mar. 8, 1979.

Patent application 6–020,299. Self Biased Ferrite Resonators. Filed Mar. 14, 1979.

Patent application 6–023,416. Uniform Load Piston Ring. Filed Mar. 23, 1979.

Patent application 6–025,413. High Speed Real Time Quantizer and Analog/Digital Converter. Filed Mar. 30, 1979.

Patent application 6–026,866. Channel Sealant Compositions. Filed Apr. 4, 1979.

Patent application 6–029,584. Flow-Closing Bleed Valve Assembly. Filed Apr. 12, 1979.

Patent application 6–029,585. Sense and Inject Moving Target Indicator Apparatus. Filed Apr. 12, 1979.

Patent application 6–029,586. Analysis of Lubricating Oils for Iron Content. Filed Apr. 12, 1979.

Patent application 6–029,947. Continuous Wave Chemically Pumped Atomic Iodine Laser. Filed Apr. 13, 1979.

Patent application 6–032,809. Thermally Stable Aromatic Eryne Polyimides. Filed Apr. 24, 1979.

Patent application 6–033,608. Method for the Preparation of Alkali Metal Salts of Dinitromethane. Filed Apr. 26, 1979.

Patent application 6–033,610. Process for Synthesizing the Alkali Metal Salts of Dinitromethane. Filed Apr. 26, 1979.

Patent application 6–036,252. Self-Determination of Laser Frequency. Filed May 4, 1979.

Patent application 612,435. Low Shear Mixing Process for the Manufacture of Solid Propellants. Filed Sept. 10, 1975.

Patent application 688,840. Low Drag Integration of Laser Beam Pointing Device Into Aircraft. Filed May 27, 1976.

Patent application 936,980. Optical Plummet Azimuth Reference Assembly. Filed Aug. 25, 1978.

Patent 4,147,515. Electro-Chemical Sensors for Gas Detection in Electron Tubes. Filed Dec. 22, 1977. Patented Apr. 3, 1979. Not available NTIS.

Patent 4,154,415. Modulating Verrier Flap Control System. Filed Dec. 30, 1977. Patented May 15, 1979. Not available NTIS.

Patent 4,155,054. Microwave Power Limiter Using Electrically Thin Iris. Filed Nov. 23, 1977. Patented May 15, 1979. Not available NTIS.

Patent 4,155,265. Interface Shear Transducer. Filed Mar. 30, 1978. Patented May 22, 1979. Not available NTIS.

Patent 4,155,308. Sabot for Simulation Testing. Filed Nov. 2, 1977. Patented May 22, 1979. Not available NTIS.

Patent 4,155,579. Rotating Detent Latch Mechanism. Filed Oct. 7, 1977. Patented May 22, 1979. Not available NTIS.

Patent 4,155,780. Method for Prestressing Turbine Disks. Filed Dec. 30, 1977. Patented May 22, 1979. Not available NTIS.

Patent 4,156,514. Cylinder Support Assembly. Filed Mar. 23, 1978. Patented May 29, 1979. Not available NTIS.

Patent 4,156,878. Wideband Waveguide Lens. Filed Jan. 25, 1978. Patented May 29, 1979. Not available NTIS.

U.S. Department of Agriculture

Research Agreements and Patent Branch, General Service Division, Federal Bldg., Agricultural Research Service Hyattsville, Md. 20782

Patent application 6–032,850. Crosslinked Starch Halohydrins and Their Nitrogen-Containing Substitution Products. Filed Apr. 24, 1979.

Patent application 6–034,881. Automatic Spinning Strength Tester. Filed Apr. 30, 1979.

U.S. Department of Commerce

National Technical Information Service, Office of Government Inventions and Patents, Springfield, Va. 22161

Patent 4,160,596. Document Reproduction Illumination/Exposure Control System. Filed Oct. 18, 1977. Patented July 10, 1979. Not available NTIS.

U.S. Department of the Interior

Branch of Patents, 18th and C Sts. NW. Washington, D.C. 20240

Patent application 6–006,138. Electrical Cable Coupler With Rotatable Protective Covers. Filed Jan. 24, 1979.

Patent application 6–027,133. Pressure Vent for Explosion-Proof Electrical Enclosures. Filed Apr. 4, 1979.

Patent application 6–029,952. Leaching Gold and Silver Ores. Filed Apr. 13, 1979.

U.S. Department of the Navy

Assistant Chief for Patents, Office of Naval Research Code 302, Arlington, Va. 22217

Patent application 6–005,256. Lattice Matching Measurement Device. Filed Jan. 22, 1979.

Patent application 6–006,055. Marine Mammal Retrieval Apparatus. Filed Jan. 24, 1979.

Patent application 6–021,135. Apparatus for Improving the Overall Efficiency of a Marine Screw Propeller. Filed Mar. 16, 1979.

Patent application 6–026,863. Fluorinated Phthalonitriles and Polyphthalocyanines Therefrom. Filed Apr. 4, 1979.

Patent application 6–026,982. Connector-to-Connector Adapter. Filed Apr. 2, 1979.

Patent application 6–028,406. Sampled Speech Compression System. Filed Apr. 9, 1979.

Patent application 6–029,223. Terrain Vehicle Contour Measuring and Storage Device. Filed Apr. 11, 1979.

Patent application 6–030,586. Active High-Power Bandpass Filter. Filed Apr. 16, 1979.

Patent application 6–030,961. A Carrier and Dispersal Mechanism for a Microorganic Mosquito Larvicide. Filed Apr. 18, 1979.

Patent application 6–031,277. Method for Isolating a Spore-Forming Mosquito Larvicide. Filed Apr. 18, 1979.

Patent application 6–033,298. Xenon Fluoride and Mercury Chloride Photocissociation Lasers. Filed Apr. 25, 1979.

Patent application 6,033,590. Vertical Seeking Aircrew Escape System. Filed Apr. 26, 1979.

Patent application 6–034,220. Pressure Differential Seafloor Corer-Carrier. Filed Apr. 30, 1979.

Patent application 6–034,221. System for Placement of Piles Into the Seafloor. Filed Apr. 30, 1979.

Patent application 6–035,663. Laser Annealing Technique for Improving the Detectivity of Detector Elements in Photovoltaic Detector Arrays. Filed May 3, 1979.

Patent application 6–039,241. Surface Elevation Measuring Apparatus. Filed May 15, 1979.

Patent application 6–039,917. Pulse Repetition Interval Generator With Stagger Compensation. Filed May 17, 1979.

Patent application 6–040,014. Pulse Repetition Interval Signal Generator. Filed May 17, 1979.

Patent application 6–042,176. Polyphenylether-Bridged Polyphthalocyanine. Filed May 24, 1979.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Birmingham Public Library	(205) 254-2555
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	Sacramento: California State Library	(916) 322–4572
	Sunnyvale Patent Library*	(408) 736-0795
Colorado	Denver Public Library	(303) 573-5152 Ext. 223
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4519
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Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 214
Nebraska	Lincoln: University of Nebraska-Lincoln, Love Library	(404) 472-3411
New Jersey	Newark Public Library	(201) 733-7740
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 790-6291
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County Public Library	(513) 369-6969
	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 242–7361 Ext. 258
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1226
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3128
	University Park: The Pennsylvania State Libraries	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 224
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 528-2957
Texas	Dallas Public Library	(214) 748-9071
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 20, 1979

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	5-1-79
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-12-78
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, Treating Processes, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions.	11-13-78
COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography.	4-2-79
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-30-78
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales.	4-13-78
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear and Reactors; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptograph; Laser Devices; Radioactive Materials; Power Metallurgy, Rocket Fuels.	5-19-78
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	2-5-79
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	8-31-78
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	9-1-78
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	12-23-77
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	8-17-78
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter.	10-13-78
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination.	11-30-78
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	5-4-78
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—G. M. FORLENZA, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Textiles; Apparel and Shoes; Sewing Machines; Machine Elements; Clutches.	7-10-78

Expiration of patents: The patents within the range of numbers indicated below expire during October 1979, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,056,137 to 3,061,832, inclusive
Plant Patents..... Numbers 2,178 to 2,188, inclusive

REISSUES

NOVEMBER 27, 1979

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 30,159

FALSE TWIST-CRIMPING MACHINE

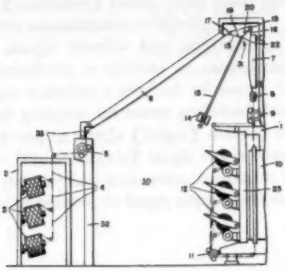
Hermann Kubler, Remscheid-Lüttringhausen, Fed. Rep. of Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Remscheid-Lennep, Fed. Rep. of Germany

Original No. 4,058,961, dated Nov. 22, 1977, Ser. No. 701,155, Jun. 30, 1976. Application for reissue Nov. 29, 1978, Ser. No. 964,525

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1975, 2530125; Oct. 4, 1975, 7531545[U]

Int. Cl.[2] D02G *1/02*

U.S. Cl. 57—291 **7 Claims**



1. A false-twist crimping machine for processing filament yarn, said machine comprising:

a side frame having a bobbin located thereon for supplying the filament yarn,

a delivery means for guiding said yarn to an upwardly inclined heating zone,

a middle frame carrying a downwardly disposed cooling zone which receives said yarn as it feeds from said heating zone,

a false-twisting means for receiving said yarn as it feeds from said cooling zone,

a take-off for supplying said yarn emitting from said false-twisting means to a winding device located at said middle frame,

said heating zone sloping at an oblique angle between said side frame and said middle frame, and

a yarn guide means positioned at the angle formed between said heating zone and cooling zone in a manner so that said yarn may run over it along a line substantially tangent from the outlet of said heating zone and along a line substantially tangent to the inlet of said cooling zone.

6. A falst-twist crimping machine for processing filament yarn, said machine comprising:

a side frame having bobbins located thereon for supplying filament yarn;

a middle frame laterally spaced from said side frame and defining a service passage therebetween for movement thereabout of a machine operator;

yarn heating means having an inlet end and an outlet end and defining an elongate heating zone terminating above the height of said side frame;

yarn delivery means associated with said side frame and said heating means for guiding the yarn to the inlet end of said heating means;

yarn cooling means associated with said middle frame and having an inlet end and an outlet end and defining an elongate cooling zone;

said heating means and said cooling means being angularly disposed relative to each other so that the inlet end of said heating means and the outlet end of said cooling means are disposed on opposite sides of said service passage, and the outlet end of said heating means and the inlet end of said cooling means are closely adjacent each other and generally form the apex of an acute angle with said apex being located at a height above said side frame, whereby the yarn is directed upwardly in the heating zone and downwardly in the cooling zone during processing;

yarn guide means positioned generally at said apex between the adjacent ends of said heating and cooling means for guiding the yarn from the heating zone to the cooling zone;

false twisting means carried by said middle frame for receiving the yarn from said cooling means; and

winding means carried by said middle frame for winding the processed yarn.

Re. 30,160

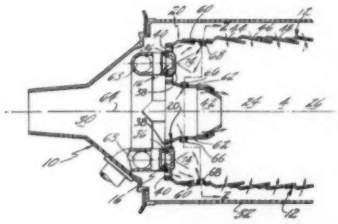
SMOKE REDUCTION COMBUSTION CHAMBER

John M. G. Emory, Jr., Vernon, and Joseph J. Faitani, Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Original No. 3,643,430, dated Feb. 22, 1972, Ser. No. 16,527, Mar. 4, 1970. Application for reissue Jun. 5, 1978, Ser. No. 912,891

Int. Cl.[2] F02C *7/00*

U.S. Cl. 60—39.65 **6 Claims**



1. A combustion chamber comprising a housing, a liner supported by the housing and spaced radially therefrom, the liner having a substantially closed end and an open end spaced axially therefrom with a first wall means therebetween, the first wall means having a plurality of openings along its axial length, the liner providing a zone for combustion of a fuel-air mixture, the combustion products being discharged through the open end, and fuel nozzle means positioned at the closed end of the liner for supplying fuel to the combustion zone wherein the improvement comprises:

said fuel nozzle means including a plurality of fuel nozzles, swirl vanes surrounding each fuel nozzle,

the closed end of the liner having a central opening therein,

inner wall means extending from the edge of said opening into said liner,

said fuel nozzles being located in said closed end spaced around said inner wall means,

air tube means positioned in said inner wall means and said first wall means downstream of each fuel nozzle and being substantially in axial alignment with the cooperating swirl vanes of the nozzle to direct air into the swirling air from the swirl vanes and the fuel from the fuel nozzle, and

said air tube means and said swirl vanes forming a recirculation zone therebetween.

Re. 30,161

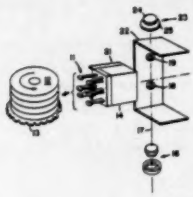
APPARATUS MEASURING RELATIVE VELOCITY OF MOVABLE MEMBERS INCLUDING MEANS TO DETECT VELOCITY FROM THE POSITION ENCODER

Andrew Gabor, Alamo, Calif., assignor to Xerox Corporation, Stamford, Conn.

Original No. 3,839,665, dated Oct. 1, 1974, Ser. No. 157,283, Jun. 28, 1971. Continuation-in-part of Ser. No. 23,569, Mar. 30, 1970, abandoned. Application for reissue Sep. 24, 1976, Ser. No. 726,386

Int. Cl.[2] G05B *5/01*

U.S. Cl. 318—616 8 Claims



8. Apparatus for the measurement of relative velocity between two relatively movable members comprising [;]: a first winding coupled to one of said members including a plurality of substantially parallel conductors each series connected to its next adjacent conductor whereby adjacent conductors of the winding carry currents in opposite direction; means for applying an electric signal to said first winding; a plurality of windings coupled to said other of said members said windings being arranged in a predetermined space phase with respect to each other; means for juxtaposing said windings in an inductive relationship for respectively producing electric alternating position signals from said plurality of windings in response to relative movement between the windings, said electric signal of said [one] *first* winding inducing said position [signal] *signals* in said other windings, said position signals having periods inversely proportional to the relative velocity between said members the peak amplitude of said position signals being substantially constant with changes in velocity and the slope of said position signals at their zero crossing being proportional to instantaneous relative velocity; means for deriving a velocity signal from said slope information of said position signals including means for differentiating said position signals with respect to time to provide a plurality of velocity signals in said predetermined space phase whose [maximum] instantaneous magnitudes are proportional to instantaneous velocity[;], *and* means for commutating said velocity signals around their maximum amplitudes to provide a unidirectional velocity ripple signal; means for deriving a reference signal from said position signals including means for sampling the peak amplitudes of said position [signal] *signals* to provide a unidirectional reference ripple signal [similar to said velocity ripple signal] and means for comparing said velocity ripple signal with said reference ripple signal to provide an error signal.

PLANT PATENTS

GRANTED NOVEMBER 27, 1979

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,490

STRAWBERRY PLANT

Royce S. Bringhurst, Davis, and Victor Voth, Santa Ana, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Oct. 23, 1978, Ser. No. 953,817

Int. Cl.[2] A01H *5/03*

U.S. Cl. Plt.—49 **1 Claim**

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

PATENTS

GRANTED NOV. 27, 1979

ERRATA

For CLASS	See PATENT NO.
433–171	4,175,322
433–126	4,175,323
433–122	4,175,324
433–060	4,175,325
433–080	4,175,326
356–004	4,175,365
346–020	4,175,378
002–173	4,175,411
073–342	4,175,418
408–083.5	4,175,471
123–030 D	4,175,501
123–041.35	4,175,502
123–041.72	4,175,503
123–052 M	4,175,504
123–090.3	4,175,505
123–117 D	4,175,506
123–117 D	4,175,507
123–117 R	4,175,508
123–117 R	4,175,509
433–032	4,175,565
141–363	4,175,600
164–106	4,175,615
269–091	4,175,728
241–046 R	4,175,814
405–043	4,175,882
430–035	4,175,955
430–037	4,175,956
430–031	4,175,957
430–049	4,175,958
430–134	4,175,959
430–058	4,175,960
430–058	4,175,961
430–109	4,175,962
430–296	4,175,963
430–253	4,175,964
430–230	4,175,965
430–438	4,175,966
430–503	4,175,967
430–559	4,175,968
430–539	4,175,969
430–529	4,175,970
430–287	4,175,971
204–159.18	4,175,972
204–159.14	4,175,973

For CLASS	See PATENT NO.
194–001 C	4,175,989
435–094	4,176,006
435–034	4,176,007
435–012	4,176,008
435–024	4,176,009
548–184	4,176,120
548–119	4,176,121
585–629	4,176,140
585–314	4,176,141
525–336	4,176,142
525–463	4,176,143
525–091	4,176,144
525–072	4,176,145
525–338	4,176,146
235–302	4,176,258
235–449	4,176,259
235–475	4,176,260
367–006	4,176,338
367–121	4,176,339

PATENTS

GRANTED NOVEMBER 27, 1979

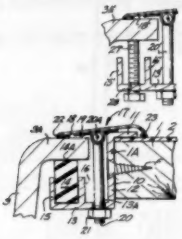
GENERAL AND MECHANICAL

4,175,292

SINK MOUNTING MEANS

Russell F. Morrison, 62 NW. Caribou La., Roseburg, Oreg. 97470

Filed Apr. 10, 1978, Ser. No. 894,684
Int. Cl.[2] E03C *1/18*
U.S. Cl. 4—187 A **12 Claims**



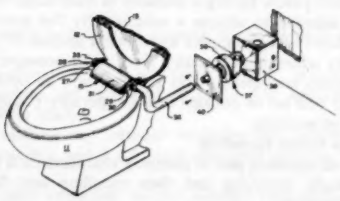
1. Sink mounting means for attachment to a cabinet counter of any thickness defining a sink receiving opening, said sink mounting means including a member of angular section having an upright web adapted for abutting securement against the vertical counter edge defining the sink receiving opening and an inwardly directed flange disposed below a plane containing the counter upper surface, said inwardly directed flange located within said sink receiving opening and defining an upwardly opening recess, a sink support member disposed within said recess, fastening means for securing the web of the sink mounting member to the vertical counter edge, said support member having an upper surface on which the underside of a sink flange is restingly supported, said inwardly directed flange having openings at intervals to receive a downwardly inserted bolt of a trim ring assembly.

4,175,293

TOILET BOWL ODOR REMOVING APPARATUS AND HINGE

Warren J. Stephens, 2970 S. 1735 East, Salt Lake City, Utah 84106, and Juan F. Nielson, 3665 S. 300 West, Salt Lake City, Utah 84115

Filed Feb. 6, 1978, Ser. No. 875,215
Int. Cl.[2] E03D *9/05*; A47K *13/00*
U.S. Cl. 4—209 R **1 Claim**



1. Odor removing apparatus for use with a conventional toilet comprising

a hood including a rearwardly extended flat flange forming a collection compartment extending fully across the hood, said flange being adapted to be coupled to the rear portion of the rim of a toilet, a pair of spaced apart sidewalls extending forwardly of the flange, and a top wall interconnecting said sidewalls, whereby the sidewalls and top wall will project over the toilet bowl when the flange is coupled to the rear portion of the rim of the toilet;

a pair of tubular spindles, each of said spindles being coupled through an end wall of the hood;

a toilet seat having spaced apart projecting ears journaled on said spindles and a straight rear edge overlying the rim of the toilet and the hood, with a top of the rearwardly extending flat flange being positioned whereby such flange does not obstruct pivoting movement of the toilet seat;

a toilet seat lid having a spaced apart projecting ears journaled on said spindles outside of the ears of the toilet seat and adapted to rest on the toilet seat;

a plug closing the projecting end of one spindle;

a duct fitting coupled to the projecting end of the other spindle and its other end adapted to be connected by a duct to a suction means whereby gases are pulled from the interior of the hood, through a spindle, the duct fitting and the duct to the intake of the suction means, said plug and the duct fitting being reversible with respect to the spindles;

the sidewalls each have a threaded port therethrough and the spindles are exteriorly threaded to be screwed into ports;

a port through the wall at the central rear thereof, said port being adapted to receive either said plug or said duct fitting; and

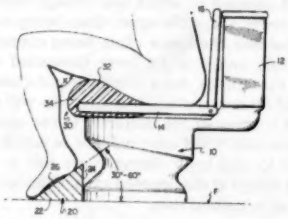
another plug adapted to close either of said spindles or the port through the wall of the hood.

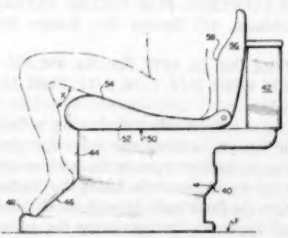
4,175,294

TOILET CONSTRUCTION

John A. Boyd, 5535 Columbia Pike, Arlington, Va. 22204

Filed Sep. 8, 1978, Ser. No. 940,703
Int. Cl.[2] A47K *13/00*
U.S. Cl. 4—237 **6 Claims**





1. An improved toilet construction comprising:

a toilet seat means adapted to fit upon a conventional toilet bowl;

said toilet seat means having an elevated configuration adja-

cent the forward end thereof to raise the user's thighs angularly upward from a horizontal disposition; and

an angled foot engaging means disposed along the lower forward portion of the toilet bowl;

said foot engaging means sloping forwardly and downwardly from said lower forward portion of the toilet bowl;

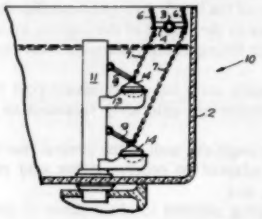
said foot engaging means being adapted for engagement by the user's feet to raise the user's heels upward and to thus angularly raise the user's feet from a horizontal disposition.

4,175,295

WATER SAVING TOILET

Robert L. Cameron, 6106 Seminole St., Berwyn Heights, Md. 20740

Filed Jun. 22, 1978, Ser. No. 918,109
Int. Cl.[2] E03D *1/14*
U.S. Cl. 4—327 **6 Claims**



1. A water saving mechanism for a toilet reservoir comprising a water evacuation column connected to a commode, a pair of conduit means communicating with said column and horizontally offset one from the other, valve ball means removeably nested within said conduit means, and linkage means connected to said valve ball means for selectively removing one of the two valve balls so as to provide different volumes of water into the commode bowl by virtue of the different vertical heights of said conduits in which said linkage means includes an upper and lower chain, the upper chain being connected to the upper valve ball, the lower chain being connected to the lower valve ball, and a single lever connected at opposed extremities to the terminal point of each of said chains whereby rotation of said lever in a clockwise direction will actuate one valve ball and rotation of the said lever in the opposite direction will actuate said other valve ball and in which said chains are connected to said lever through ears and in which said lever is spring biased at the opposed extremities so as to return said lever to an initialized state.

4,175,296

VARIABLE CONTROL FOR TOILET FLUSH TANKS

Harley R. Goldman, 417 Roslyn Rd., Roslyn Heights, N.Y. 11577

Filed Oct. 11, 1977, Ser. No. 840,573
Int. Cl.[2] E03D *1/14, 1/34, 3/12*; F16K *31/28*
U.S. Cl. 4—325 **9 Claims**

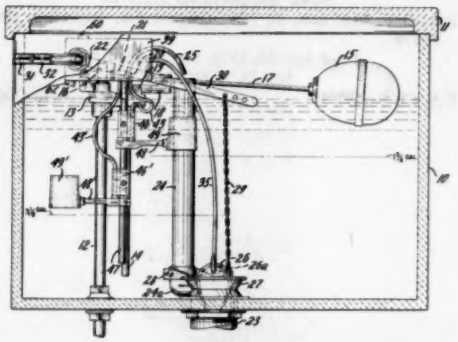
1. For use in a toilet flush tank having a flush discharge opening at the bottom, a discharge valve for closing the discharge opening, a chamber open at the bottom and carried by the discharge valve and means for lifting the discharge valve to flush water from the flush tank through the discharge opening, a flush control apparatus for regulating the amount of water flushed from the tank comprising,

a plurality of vents mounted within the flush tank at different heights,

a water level responsive valve including float control means normally closing each of said vents when the water in the tank is high enough to buoy said float control means,

air passage means adapted to be coupled between the chamber in said discharge valve and said vents, and

selector means coupled to said vents and said air passage means for selecting the operative vent, whereby air trapped within the chamber when the discharge valve is



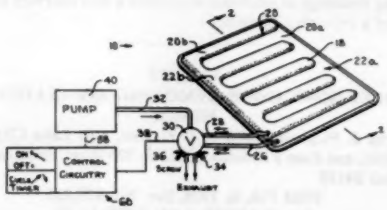
unseated retains the discharge valve in floating condition until the water level in the tank falls to a level at which the water level responsive valve associated with the selected vent is opened to vent the entrapped air in said chamber to cause the discharge valve to drop to seated position and close the discharge opening.

4,175,297

INFLATABLE PILLOW SUPPORT

William E. Robbins, 4850 Sutton Ave., and Robert H. Richardson, 8361 Sylvan Dr., both of Melbourne, Fla. 32901

Filed Feb. 3, 1978, Ser. No. 875,124
Int. Cl.[2] D47C *7/74*
U.S. Cl. 5—284 **15 Claims**



1. An alternating pressure support for the human body, said apparatus comprising in combination:

a flexible pillow having a plurality of fluid-impervious pockets adapted to assume a substantially flat position when deflated and to support an adjacent section of the human body when inflated with a fluid under pressure, with said pockets interspersed and grouped into an operably coupled first set of pockets and an operably coupled second set of pockets;

pumps means including,

(a) an opposing pair of pumping chambers each for periodically receiving and then expelling said fluid under pressure,

(b) electrical means operably coupled between said pumping chambers for alternately compressing one of said pumping chambers while expanding the other one of said pumping chambers, thereby alternately pumping said fluid under pressure from each of said pumping chambers; and

valve means operably coupled between said pump means and said flexible pillow for alternately inflating and exhausting said fluid under pressure through said first pockets and said second pockets, thereby alternately support-

ing interspersed sections of the body adjacent said first and said second sets of pockets.

4,175,298

HANDLE FOR FREE-CUTTING DEVICES

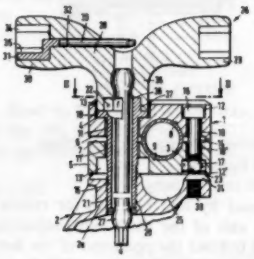
Erich Müller, Waiblingen, and Joachim Kottke, Neckargröningen, both of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 724,972, Sep. 20, 1976, abandoned. This application Feb. 21, 1978, Ser. No. 879,485

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1975, 7529517

Int. Cl.[2] B25F *1/00*; B26B *7/00*

U.S. Cl. 7—138 **19 Claims**



1. A handle for a free-cutting device, which includes: a handle section comprising clamping means operable to receive and clamp therebetween handle bar means so that the latter project from both sides of said clamping means, carrier means supported by said handle section for carrying a free-cutting device, and means included cooperative with said clamping means and said carrier means for selectively permitting pivoting of that portion of said clamping means which is adapted to receive and clamp said handle bar means therebetween relative to said carrier means and to arrest said portion of said clamping means in at least two positions.

4,175,299

POWER TOOTHBRUSH OR THE LIKE WITH ORBITAL BRUSH ACTION

Walter D. Teague, Jr., Tweed Blvd., Nyack, N.Y. 10960, and Arthur T. Sempliner, 37-04 Van Nostrand Pl., Douglaston, N.Y. 11363

Filed Nov. 7, 1977, Ser. No. 848,807

Int. Cl.[2] A46B *13/02*

U.S. Cl. 15—22 R **1 Claim**

1. A powered toothbrush appliance or the like, which comprises

(a) a housing including an opening at the topmost portion thereof,

a cap member, formed of a resilient material, supported by said housing and extending generally over said opening,

(c) a wobble shaft,

(d) said resilient cap member mounting said wobble shaft non-rotatably and for limited universal pivoting movement,

(e) said shaft extending axially through said resilient cap member and including a portion disposed outside said housing and a portion disposed within said housing,

(f) said portion of the wobble shaft within the housing having a lower end portion

(g) cooperating means on said wobble shaft and said resilient cap member to prevent axial displacement of said wobble shaft relative to said cap member,

(h) an electrical motor having a rotary output shaft extending within said housing,

(i) a rotary displacement member carried by said rotary output shaft,

(j) said rotary displacement member including an opening,

(k) the lower end portion of said wobble shaft being received through the opening whereby the wobble shaft is driven

through an orbital path as a function of the effective radius and rotation of said displacement member, and

(l) a working element being supported by said wobble shaft at the end thereof disposed outside said housing.

4,175,300

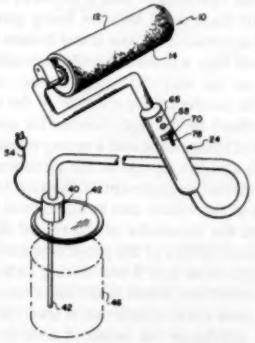
PAINT ROLLER CONSTRUCTION

John J. McGlew, and John J. McGlew, Jr., both of 432 Terrace Ave., Hasbrouck Heights, N.J. 07604

Continuation of Ser. No. 684,728, May 10, 1976, abandoned. This application Feb. 2, 1978, Ser. No. 874,508

Int. Cl.[2] B05C *1/00*

U.S. Cl. 15—103.5 **24 Claims**



1. A liquid applicator for applying a liquid such as a paint to a receiving surface, comprising a handle support having a rotational support portion, a hollow cylindrical roller having a porous cylindrical outer surface rotatably supported on said rotational support portion of said handle support, a plurality of conduits defined through said handle support and said rotational support and connected into the interior of said cylindrical roller at axially spaced locations therein, means mounted on said handle support for selectively controlling the rate of flow through each of said conduits, a pump connected to said conduits and to said handle support for supplying a liquid through said conduits and into said cylindrical roller for passage through the porous surface thereof, and a motor carried by

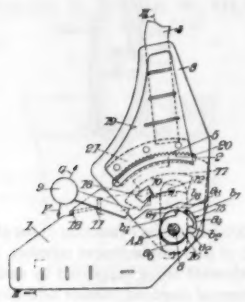
said handle support and connected to said hollow cylindrical roller to rotate said porous surface at a predetermined speed.

4,175,301

SEATHINGE

Alain Letournoux, Orleans, and Charles Canals, Mennecy, both of France, assignors to Societe Industrielle Bertrand Faure, Etampes, France

Filed Jan. 6, 1978, Ser. No. 867,492
Claims priority, application France, Jan. 13, 1977, 77 00876
Int. Cl.[2] E05D *11/10*
U.S. Cl. 16—146 **4 Claims**



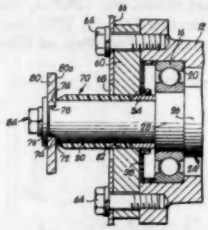
1. A seat-hinge for connecting the back to the sitting portion of a seat and comprising a first member to be fixed relative to the sitting portion and carrying a first toothed sector centered on an axis A, said axis A extending, in operation, horizontally and transversely of the sitting portion, a second member to be fixed relative to the back and carrying a second toothed sector centered on an axis B parallel to axis A, the sectors being engageable and disengageable with one another in response to movement of the two axes A and B towards and away from coincidence and the second member being provided with an opening which is centered on axis B and houses a hub; a rotary cam fixed to said hub, a control handle accessible, in use, to a person sitting on the seat and linked to the cam so that the operation of this handle causes rotation of the cam about axis B, a surface defined by the first member for coacting with an active area of the rotary cam, and a spring means for angularly urging the cam and the handle in the direction which corresponds to the mutual engagement of the two toothed sectors, the active area of the rotary cam being formed by an outward projection from the remainder of the rim of the cam and the radially outermost surface of the projection having the form of an arc of a spiral about axis B and having ends of greater and smaller radius which are joined to the said remainder of the rim by a narrower neck portion such that at least the said end of the greater radius overhangs the adjacent portion of the said remainder of the rim of the cam, the surface defined the first member for coacting with the active surface of the cam forming part of the edge of an aperture in the first member and having a first section in the form of an arc of a spiral about axis A upon which, in operation, the spiral arc surface of the cam projection slides and against which said surface of said cam projection then jams, responsive to rotation of the cam in a first direction, so as to lock the hinge, and an adjacent cut-out section providing a bearing zone against which the said end of greatest radius of the spiral arc surface of the cam projection bears, responsive to reverse rotation of the cam, to unlock the hinge such that, in operation, the cam rocks about this bearing zone to cause axes A and B to move apart and disengage the toothed sectors.

4,175,302

SEALED FEATHER PICKING UNIT

Donald J. Scheier; David R. Crawford, both of Kansas City, Mo., and David M. McDonald, Kansas City, Kans., assignors to Simon-Johnson, Inc., Kansas City, Mo.

Filed Jul. 28, 1978, Ser. No. 929,121
Int. Cl.[2] A22C *21/02*
U.S. Cl. 17—11.1 R **8 Claims**



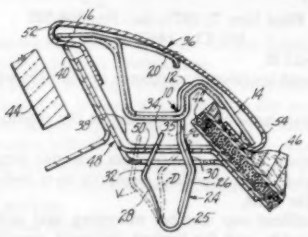
1. A rotary feather picking unit including:
an open-ended housing;
bearings within said housing;
a shaft supported by said bearings for rotation about the longitudinal axis of the shaft and projecting outwardly through and beyond the open end of the housing;
feather-engaging means secured to said shaft at the outer end of the latter for rotation therewith;
an annular seal outwardly adjacent said bearings and circumscribing said shaft in sealing relationship with the latter and with the housing so as to close said open end of the housing;
a close-fitting sleeve surrounding said shaft from said feather-engaging means inwardly toward said seal; and
means for holding said sleeve stationary with the seal and the housing during rotation of the shaft.

4,175,303

MOLDING CLIP

Nicholas M. Benedetti, Sterling Heights, Mich., assignor to USM Corporation, Farmington, Conn.

Filed Jan. 9, 1978, Ser. No. 867,764
Int. Cl.[2] A44B *21/00*
U.S. Cl. 24—73 FT **5 Claims**



1. A clip for retaining an elongated trim strip in a bridging position over a gap between two spaced members wherein the clip is attached to a panel disposed within the gap, comprising a body portion having a pair of resilient arms extending outwardly from one side thereof for engagement with one edge of the elongated trim strip, and a resilient tongue extending outwardly from the opposite side of said body portion for engagement with the opposite edge of the trim strip, a resilient leg extending downwardly from said body portion into said gap with said arms and said tongue engaged in said trim strip bridging said gap, said leg being of substantially diamond shaped cross-section and having a lower V shaped portion comprising

a bight from which extends a pair of divergent lower leg portions and an upper portion comprising a pair of convergent upper leg portions, a first of said upper leg portions connecting said leg to said body portion to form an obtuse angle with one of said lower leg portions and a second of said upper leg portions connected to the other of said lower leg portion to form an obtuse angle therewith and terminating in a free end in spaced relation with said first upper leg portion, whereby said lower leg portion facilitates entry of said leg into a slotted opening in said panel disposed in said gap and upper leg portion serves to retain said leg in said slotted opening with said lower leg portion extending entirely through said slotted opening, and a pair of elongated spring fingers disposed one on each of said arms and extending generally toward said tongue and crosswise of a portion of a trim strip having one edge thereof engaged with said arms and the opposite edge engaged with said tongue.

4,175,304

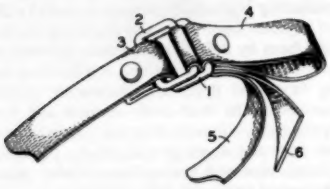
STRAP CLOSURE

Richard P. Bentley, Box 786, Tupper Lake, N.Y. 12986

Division of Ser. No. 801,330, May 27, 1977, Pat. No. 4,142,734. This application Dec. 12, 1978, Ser. No. 968,852

Int. Cl.[2] A44B *11/18*

U.S. Cl. 24—197 **1 Claim**



1. A strap closure comprising an assembly of two rectangular rings and a release loop, said rectangular rings held together by means of a single loop of strap, or other material, passing through both rings, said loop passing through both rings providing the means to attach said strap closure to a strap or other structure, and said release loop comprising a piece of strap, or other material with similar surface friction, attached to one of the rectangular rings by means of a portion of said release loop fastened around that portion of said rectangular ring opposite and parallel to said single loop passing through both rings, said closure assembly openably joined to a mating strap by means of said mating strap end being threaded through the release loop equipped rectangular ring, on through the second rectangular ring, around the outside of said second rectangular ring, and back through the release loop equipped rectangular ring between the mating strap and said release loop.

4,175,305

CLIP FOR GRIPPING FABRIC OR THE LIKE

Robert E. Gillis, P.O. Box 67, Santa Cruz, Calif. 95003

Filed Aug. 17, 1977, Ser. No. 825,410

Int. Cl.[2] A44B *21/00*

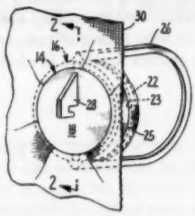
U.S. Cl. 24—245 R **3 Claims**

1. A fastener for attachment to a web of flexible material comprising in combination:

a. female element comprising a collar having a side wall formed as a hollow cylinder and a flat out-turned rim surface surrounding said side wall at a right angle to said cylinder,

b. a male element having a plug portion having an external cylindrical wall and an out-turned rim extending around said plug, said external cylindrical wall being complementary to said hollow cylinder and said out-turned rim having a flat surface adapted to lie against the flat out-turned rim surface of the female element,

c. whereby said female element can be placed against said web on a first side of the web and said male element can be placed on the opposite side of the web and pushed through said female element, distorting said web, and brought back to lie substantially against the female element with the



web engaged (1) between the flat surfaces of the two out-turned rims, and (2) between the side wall of the hollow cylinder and the external cylindrical wall of the male element wherein the flat surfaces of the web held between the two out-turned rims is parallel to the main portion of the web,

d. wherein said female element has a loop bridging opposite sides of the collar.

4,175,306

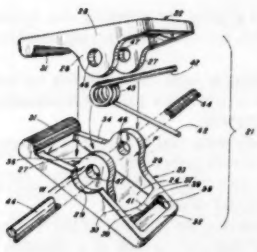
MOLDED SPRING-BIASED GARMENT CLAMP

Jerome J. Bigelow, Bethel, Conn., and Jeffrey A. Bigelow, Rte. 53, West Redding, Conn. 06896, assignors to Jeffrey A. Bigelow, West Redding, Conn.

Continuation-in-part of Ser. No. 793,294, May 5, 1977, abandoned. This application Jun. 12, 1978, Ser. No. 914,398

Int. Cl.[2] A44B *21/00*

U.S. Cl. 24—253 **9 Claims**



1. An economical pivoting spring biassed garment clamp for use as a clothespin or garment hanger clip comprising a pair of identical and interchangeable molded clamp jaws designed for facing interfitting pivoting engagement, each jaw having

an elongated back bounded by side edges;

a convex gripping sector end protruding inward toward the facing clamp jaw;

a manually depressible actuating end opposite the convex gripping sector end;

a first flush trunnion flange protruding inward from one side edge and having a convex free end;

a second inset trunnion flange protruding inward from a zone of the back near the other side edge and laterally spaced toward the first flush trunnion flange by a concave step having substantially the same width as the width of the first flush trunnion flange providing flush non-snagging alignment of an outer face of each first flush trunnion flange with the juxtaposed side edge of the interfitting clamp jaw;

means forming alignable pivoting apertures extending laterally through both trunnion flanges;

a pivot rod extending through the alignable pivoting apertures holding the clamp jaws in angular pivoting engagement with their trunnion flanges interfitting to provide laterally-spaced wide stable anchoring pivot support for both clamp jaws;

a resilient spring urging the manually depressible actuating ends apart while simultaneously maintaining the pair of clamp jaws in axial facing alignment and thereby urging the gripping sectors together in clamping juxtaposition.

4,175,307
THREAD GRIPPER

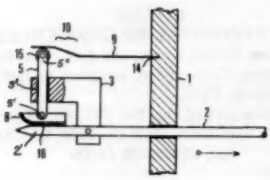
Alois Altenweger, Uster, Switzerland, assignor to Zellweger Uster AG, Uster, Switzerland

Filed Mar. 16, 1978, Ser. No. 887,440

Claims priority, application Switzerland, May 10, 1977, 5820/77

Int. Cl.² D03J *1/18*

U.S. Cl. 28—211 **8 Claims**



1. A thread gripper for engaging and holding threads at a textile machine, especially warp-tying machines and the like, comprising:

means defining at least two clamping surfaces which coact with one another in a pair for frictionally engaging and holding threads;

said means defining said at least two clamping surfaces providing a thread gripper device;

means for imparting predetermined movements to said thread gripper device;

means for varying the intensity of the frictional force acting upon the engaged threads as a function of the path of travel through which the thread gripper device moves;

said means defining said at least two clamping surfaces including

a support member capable of moving relative to the textile machine and operated by said means for imparting said predetermined movements to said thread gripper device;

at least one pivotably mounted clamping plate;

means for movably mounting said clamping plate at said movable support member;

clamping plate guide member mounted on said support member and carrying said means for movably mounting said clamping plate;

said means for varying the intensity of the frictional force comprising a fixedly mounted control cam having a surface forming a transition phase; and

spring means cooperating with the surface forming the transition phase of said control cam such that the clamping force changes in a predetermined manner as a function of the movement of the support member relative to the textile machine.

4,175,308
GATHERING THE ENDS OF HEAT-CONDUCTING PIPES IN HEAT EXCHANGERS

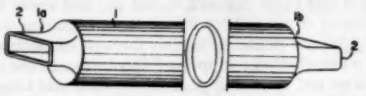
Akira Togashi, 14-31, 6-chome, Ryoke, Urawa-shi, Saitama-ken, Japan

Filed Mar. 15, 1976, Ser. No. 667,108

Claims priority, application Japan, Mar. 19, 1975, 50-33227

Int. Cl.² B23P *15/26*

U.S. Cl. 29—157.3 C **6 Claims**



1. In the manufacture of a heat exchanger, in which a fluid to be preheated is passed in the heat-conducting pipes having oval cross sections and a hot fluid is passed through a gap formed between these oval pipes, thereby causing heat transfer between said fluid in the pipes and said hot fluid in the gap between the pipes, a method of gathering and holding ends of plural heat-conducting pipes characterized in radially distorting the ends of adjacent oval pipes and flattening portions of the ends to form faces by deforming inwardly parallel to longest dimensions of the oval cross sections and forming thereby relatively long faces and deforming outwardly parallel to shortest dimensions of the oval cross sections and forming thereby relatively short outward extended joining faces and gathering these ends and abutting and joining together said joining faces of each pipe with joining faces of other pipes, and surrounding the joined ends with a thermal strain-compensating frame made of the same material as the pipes.

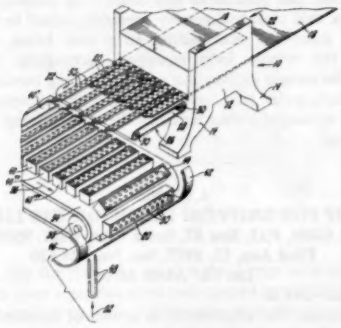
4,175,309
CONVEYORIZED FIN ACCUMULATOR

James A. Barnard, Olcott, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 15, 1978, Ser. No. 915,891

Int. Cl.² B23P *15/26*

U.S. Cl. 29—157.3 R **3 Claims**



1. A method of forming elongated heat exchanger fins from a continuous sheet of material having a width equal to a multiple of the width of a single fin and for collecting the fins in stacked relationship comprising:

forming the sheet into longitudinally continuous adjacent fin strips with a width equal to the width of the fins, forming successive portions of each fin strip into integrally interconnected fins, severing each fin strip into adjacent finite

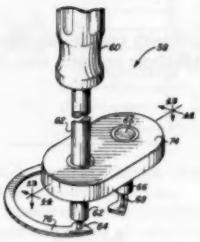
fins with the fins in one strip being longitudinally staggered with respect to the fins in each adjacent strip and with the fins in alternate and intermediate strips being transversely aligned, simultaneously progressing the finite fins of the alternate and the intermediate fins strips in the longitudinal direction, collecting the transversely aligned fins of the alternate fin strips, moving the collected fins one fin width in the transverse direction, collecting the transversely aligned fins of the intermediate fin strips over the respective fins of the alternate fin strip.

4,175,310

SNAP RING TOOL

William R. Boyd, 3757 Rosewood Ave., Los Angeles, Calif. 90066

Filed Jul. 5, 1977, Ser. No. 812,998
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—229 **11 Claims**



1. A tool for snap rings of the type having an eyelet opening and mounted in a groove of a member, comprising:

an elongated element rotatable about its major longitudinal axis, said element having a circular periphery at one end concentric to said major axis for rolling engagement against the member;

an elongated pin mounted to said one end of the element and extending longitudinally therefrom in offset relation to said major axis, said pin configured for insertion within the eyelet opening of a snap ring with the circular periphery of said element in rolling engagement against the member whereby rolling rotation of said element causes radial displacement of said pin to pry the snap ring from the groove;

a second elongated element of circular configuration for rolling engagement against the member, said second element extending parallel to said first mentioned element;

drive means for rotating said second element oppositely to rotation of said first element; and

a second elongated pin mounted to and extending from said second element in offset relation to the rotational axis of said second element, said second pin configured for insertion within another eyelet opening of the snap ring with the second element in rolling engagement with the member, whereby rolling rotation of said first and second element causes radial displacement of the associated pins to pry the snap ring from the groove.

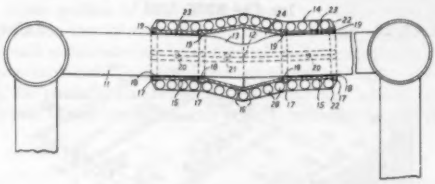
4,175,311

JOINTS

Thomas W. Bunyan, London, England, assignor to Pilgrim Engineering Developments Limited, London, England

Filed Jun. 15, 1977, Ser. No. 806,647
Claims priority, application United Kingdom, Jun. 16, 1976, 4520/76; Mar. 11, 1977, 10489/77
Int. Cl.[2] B23P *7/00*
U.S. Cl. 29—402.18 **6 Claims**

1. A method of repairing a damaged structural tubular member including the steps of providing a sleeve which is divided longitudinally and has cylindrical end portions and an enlarged central portion, placing the said divided sleeve around said structural tubular member with said enlarged portion around said damaged part, so that there is a space between each cylindrical end portion of the sleeve and the adjacent part of the



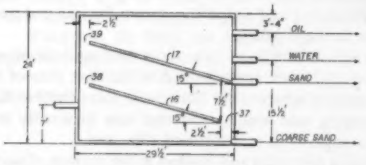
tubular member, closing the ends of at least the said spaces between the cylindrical end portions and the tubular member, injecting a hardenable composition through the wall of the sleeve into the space between the closed ends, and maintaining the composition under pressure until set.

4,175,312

METHOD OF ASSEMBLING A SETTLING TANK

Fan-Sheng Tao, Morro Bay, Calif., and John E. Warner, Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 827,914, Aug. 26, 1977, Pat. No. 4,122,016, which is a continuation-in-part of Ser. No. 710,076, Jul. 30, 1976, abandoned. This application May 30, 1978, Ser. No. 910,400
Int. Cl.[2] B23P *19/00*
U.S. Cl. 29—428 **4 Claims**



1. A method for assembling a settling tank for resolving a mixture of oil, solids, and water comprising,

(a) forming an upright tank with an inlet in the lower back side thereof for injecting the mixture of oil, solids, and water across the length of the tank from back to front and with a bottom,

(b) mounting two vertically spaced apart baffles in the tank each declined forwardly for forming lower, intermediate, and upper compartments,

(c) forming a lower port in the lower front end of the lower declined baffle in the tank for receiving fluid flow up from the lower compartment for flowing to the intermediate compartment,

(d) forming a port in the upper rear end of the tank upper declined baffle for fluid flow from said intermediate compartment upwardly to the upper compartment,

(e) the tank bottom and the two baffles forming means for receiving solids from the mixture of oil, solids, and water as it passes thereover,

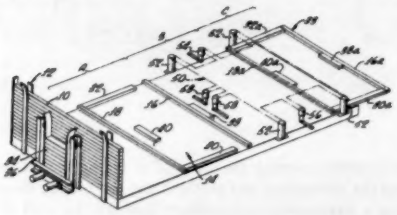
(f) forming a water outlet in the tank in the lower end of the upper compartment for discharge of solids-free and oil-free water, and

(g) forming an oil outlet in the tank for the upper compartment above the water outlet for drawing off solids-free and water-free oil.

4,175,313
METHOD AND APPARATUS FOR MANUFACTURING DOOR FRAMES

Paul G. Neumann, 1324 Hickory La., Orange, Calif. 92666

Filed Apr. 20, 1978, Ser. No. 898,108
Int. Cl.[2] B27F 7/02
U.S. Cl. 29—430 5 Claims



1. A method for making a door frame including a lockblock comprising the steps of:

providing an elongated assembly platform having a rear end portion and a forward end portion;

positioning on said rear end portion of lockblock;

positioning a forward stile to the rear of said lockblock, said forward stile having end portions and a mid-portion;

positioning a rear stile to the rear of said forward stile;

positioning a pair of headers between said forward and rear stiles;

providing supporting means for said end portions of said forward stile and for said lockblock;

aligning said lockblock along the mid-portion of said forward stile in contact therewith and fastening said lockblock to said mid-portion;

conveying said forward stile with said lockblock fastened on the forward side thereof along said assembly platform;

terminating said supporting means of said lockblock while maintaining said supporting means for said end portions of the forward stile;

rotating said forward stile about its longitudinal axis until said lockblock is positioned to the rear thereof and in a common substantially horizontal plane therewith;

conveying said headers and rear stile forwardly to form a rectangle with said forward stile; and

fastening said stiles and headers at the corners of said rectangle, thereby forming said door frame with the lockblock fastened inside along the midportion of the forward stile thereof.

4,175,314
PNEUMATICALLY CONTROLLED STAPLING SYSTEM

Charles W. Spehrley, Jr., Quechee, Vt., assignor to Xerox Corporation, Stamford, Conn.

Filed May 1, 1978, Ser. No. 901,929
Int. Cl.[2] B25C 7/00
U.S. Cl. 29—432.1 14 Claims

1. A method of stapling at least two sheets to one another, including the steps of:

applying a pressurized fluid to a staple driver so as to force a staple through the sheet; and

exhausting the pressurized fluid from the staple driver to a staple clincher so as to clinch the portion of the staple legs protruding through the sheets.

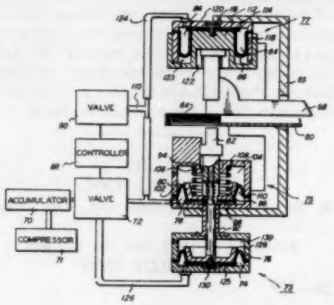
3. An apparatus for stapling at least two sheets to one another, including:

means for driving a staple through the sheets;

means for clinching the portion of the staple legs protruding through the sheets;

a source of pressurized fluid; and

control means for placing said pressure source in communication with said driving means to actuate said driving means, said control means placing said clinching means in

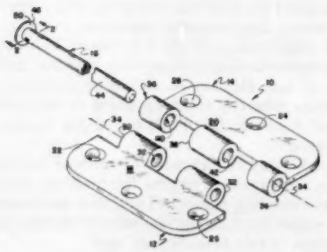


communication with said driving means so that the fluid exhausting therefrom activates said clinching means.

4,175,315
ALL PLASTIC HINGE HAVING A NON-RISING PIN AND METHOD OF MAKING THE SAME

Frank F. Hayes, Sr.; Frank F. Hayes, Jr, and John C. Hayes, all of 3120 El Dorado, Las Vegas, Nev. 89120

Filed May 9, 1977, Ser. No. 795,218
Int. Cl.[2] B23P 11/02; B29C 25/00; B29D 31/00
U.S. Cl. 29—453 4 Claims



1. A method of making a door hinge half comprising hinge leaf having a plurality of knuckles thereon providing an axial pin receiving passage wherein one of the knuckles provides axially spaced first and second passages of lesser and greater dimension transverse to the axis respectively, comprising

placing an organic polymeric material in a mold having a knuckle cavity traversed by a mold pin, of generally constant cross-sectional dimension, establishing the passage sections;

creating a temperature differential in the mold wherein the mold adjacent the second passage section is hotter than adjacent first passage section;

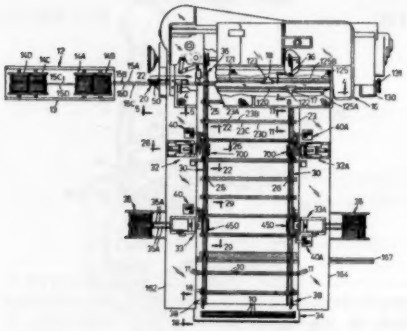
withdrawing the molded hinge half from the mold when the temperature of the knuckle adjacent the second passage section is greater than the temperature of the knuckle adjacent the first passage section;

cooling the knuckle to ambient temperature and allowing the knuckle adjacent the second passage section to shrink a greater amount than adjacent the first passage section.

4,175,316
WIRE LEAD CLAMPING MECHANISM FOR WIRE LEAD PRODUCTION APPARATUS

Ragnar Gudmestad, West Allis, Wis., assignor to Artos Engineering Company, New Berlin, Wis.

Filed Jun. 5, 1978, Ser. No. 912,718
Int. Cl.[2] H01R *43/04*; H02G *1/12*
U.S. Cl. 29—564.4 **7 Claims**



1. Apparatus for high-speed production of sets of accurately and identically sized wire leads comprising:

a feed mechanism having means for simultaneously drawing a plurality of separate strands of wire from a plurality of wire reels;

mechanism having means for simultaneously straightening and arranging the strands drawn therethrough in parallel spaced apart relationship in a common generally horizontal plane;

a severing mechanism having means for simultaneously severing sets of wire segments of predetermined length from the strands;

conveyor clamps having means for receiving sets of wire segments from said feed mechanism and for releasably gripping said sets of wire segments in parallel spaced apart relationship in a common generally horizontal plane;

at least one processing mechanism having means for performing a work operation on the ends of said sets of wire segments;

a collecting station for receiving said leads after the work operation has been performed thereon;

conveyor means for advancing the conveyor clamps and sets of wire segments therein through said processing mechanism and to said collecting station;

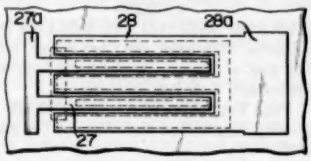
and conveyor clamp actuator mechanisms having means for causing the conveyor clamps to initially receive sets of wire segments from said feed mechanism for conveyance and to subsequently release the finished leads for deposit at said collecting station.

4,175,317
METHOD FOR MANUFACTURING JUNCTION TYPE FIELD-EFFECT TRANSISTORS

Kiyoshi Aoki, and Hisao Kamo, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 22, 1977, Ser. No. 853,868
Claims priority, application Japan, Nov. 24, 1976, 51/140214
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—571 **10 Claims**

1. A method for manufacturing a junction field-effect transistor comprising a first step for preparing a semi-conductor substrate of a high impurity concentration and one conductivity type, a second step for forming on the substrate a semiconductor layer of a low impurity concentration and the same conductivity type as that of said substrate, a third step for forming in one side of said semiconductor layer at least one portion of a gate region of a conductivity type opposite to that of said substrate, a fourth step for forming on the side of said semiconductor layer an insulating film with a partial opening, a fifth step for forming in the side of said semiconductor layer the other portion of said gate region of a conductivity type opposite to that of said substrate by introducing an impurity into said semiconductor layer through said opening, said gate region surrounding a part of said semiconductor layer, a sixth step for partially removing said insulating film located over said part of said semiconductor layer surrounded by said gate

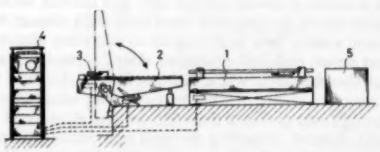


region, a seventh step for forming in the surface of said part of said semiconductor layer surrounded by said gate region and spaced apart therefrom a source region with a conductivity type opposite to that of said gate region by introducing an impurity into said semiconductor layer through the removed portion of said insulating film, and an eighth step for forming gate electrodes and source electrodes attached to said other portion of said gate region and to said source region respectively, said source electrodes extending across said one portion of said gate region on said insulating film.

4,175,318
APPARATUS OF ASSEMBLING FUEL ROD BUNDLE

Mitsuaki Matsuura, Yokohama; Tsuyoshi Hidano, and Masahiro Suzuki, both of Tokai, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Kigyodan, Tokyo, Japan

Filed Apr. 28, 1977, Ser. No. 791,824
Claims priority, application Japan, May 22, 1976, 51-58524
Int. Cl.[2] B23P *19/00*
U.S. Cl. 29—723 **15 Claims**



1. An apparatus for assembling a fuel rod bundle which has a number of fuel rods arranged in parallel with each other and fixed at given positions by means of a plurality of spacers and a lower tie plate comprising:

a fuel rod supply apparatus including

a base movable in a direction at right angles to a longitudinal direction of the fuel rods to be assembled and being stopped at any one of several selected given positions,

a mechanism arranged on the movable base and being movable in the direction at right angles to the longitudinal direction of the fuel rods for carrying and positioning the successive fuel rods at a given position, and

a mechanism arranged on said movable base for moving upwardly the fuel rod positioned at said given position and feeding the raised fuel rod in its longitudinal direction; and

a bundling apparatus arranged on a line extending from said supply apparatus and including an elongated base,

a mechanism arranged on the elongated base for holding the lower tie plate,

a plurality of mechanisms arranged on the elongated base

along its longitudinal direction for holding said plurality of spacers,

a main shaft extending through said mechanisms, and

a mechanism for rotating said main shaft so as to rotate in an interlocking manner the lower tie plate and spacers held by said holding mechanisms, whereby after said movable base is moved at the given position and said lower tie plate and spacers are rotated to given angular positions the raised fuel rod positioned at the given position is inserted into the spacers and lower tie plate at given positions.

4,175,319

APPARATUS FOR ASSEMBLING ROLLER BEARINGS

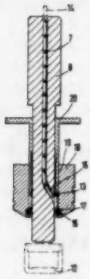
Josef Frauenhoffer, Mülheim, and Gerd Rüger, Heusenstamm, both of Fed. Rep. of Germany, assignors to Löhr & Bromkamp GmbH, Offenbach, Fed. Rep. of Germany

Filed Feb. 23, 1978, Ser. No. 880,359

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1977, 2708990

Int. Cl.[2] B23P *19/04;* **F16C** *43/06*

U.S. Cl. 29—724 **5 Claims**



1. An apparatus for assembling roller bearings in a bearing bushing comprising an axially immovable outer sleeve member, an applicator sleeve carried within and coaxial with said outer sleeve member for axial sliding movement with respect to said outer sleeve member between a first position and a second position, a piston coaxial with and carried within said applicator sleeve for rotatable movement with respect thereto, said piston axially fixed with respect to said outer sleeve member, said piston and said applicator sleeve forming an annular channel therebetween when said applicator sleeve is in said first position, a collector channel extending substantially axially through said piston, a delivery opening at one end of said collector channel extending through said piston obliquely of said collector channel and communicating between said collector channel and said annular channel, and means connected with the other end of said collector channel for supplying roller bearings thereto, whereby a plurality of said roller bearings are fed into said annular channel for simultaneous insertion into a bearing bushing when said applicator sleeve is moved from the first position into the second position.

4,175,320

CONDUCTOR TERMINATING APPARATUS

John P. Nijman, West Hill, Canada, assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation-in-part of Ser. No. 772,222, Feb. 25, 1977, abandoned. This application Sep. 8, 1977, Ser. No. 831,470

Int. Cl.[2] H01R *43/04*

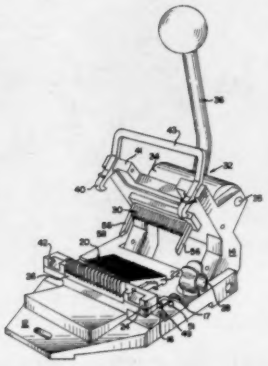
U.S. Cl. 29—749 **14 Claims**

1. Apparatus for simultaneously terminating a plurality of insulated conductors in the contact members of an electrical connector, comprising:

a base including means for supporting the connector in conductor-receiving position;

a carriage pivotally attached to said base and movable between an open position wherein said carriage is remote from said connector and an operating position wherein said carriage is adjacent said connector;

an insertion tool mounted for reciprocal movement in said carriage and including means for engaging and pressing said conductors into respective contact members of the connector when said carriage is in said operating position to thereby terminate said conductors in said respective contact members;



rotatable cam means mounted on said carriage for moving said insertion tool into and out of conductor-terminating engagement with said connector, said cam means including cam actuating means for rotating said cam means; and

self-locking latch means on said carriage adjacent its distal end for retaining said carriage in said operating position and including release means located adjacent said cam actuating means when said insertion tool is in conductor-terminating engagement with said connector.

4,175,321

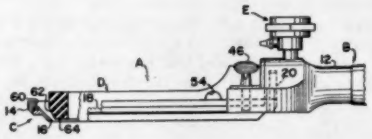
TRIMMING KNIFE

Louis A. Bettcher, Amherst, Ohio, assignor to Bettcher Industries, Inc., Birmingham, Ohio

Continuation-in-part of Ser. No. 842,585, Oct. 17, 1977, Pat. No. 4,142,291. This application Oct. 2, 1978, Ser. No. 947,487

Int. Cl.[2] B26B *29/00*

U.S. Cl. 30—276 **4 Claims**



1. A hand-held and manipulated knife for trimming a comestible product such as, meat and having a frame assembly including a handle projecting radially from an annular member of short axial length in which a ring-like blade of short axial length having an annular cutting edge at one end is rotatably supported and power driven, a gauge assembly comprising a tubular-like member within the blade and having a base part at one side connected to the frame assembly of the knife and a flexible arcuate gauge part proper having at least one end connected to the base part and being spaced from the interior surface of the blade to provide a gap or space between the blade and the flexible arcuate gauge part of the gauge assembly for the passage of a product slice therethrough and a gauge adjusting member connected to the frame assembly and to the gauge assembly for adjusting the gauge assembly axially of the

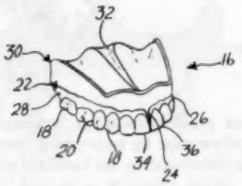
knife blade characterized by the gauge adjusting member being located at the outer circumference of the gauge assembly.

4,175,322

COMPLETE DENTURE PROSTHESES AND METHOD OF FITTING

Kenneth E. Tureaud, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Sep. 21, 1977, Ser. No. 835,143
Int. Cl.[2] A61C *13/00*
U.S. Cl. 433—171 **20 Claims**



1. A denture comprising:

a segmented hard base structure of a configuration generally in conformance with human mandibular or maxillary ridges, each segment of said hard base structure formed of a hard rigid material and means joining said segments together into said general configuration allowing said segments to be laterally adjusted in position relative to each other;

a plurality of prosthetic teeth disposed about and bonded to the lower portion of each segment of said hard base structure, said prosthetic teeth shaped and positioned on said hard base structure so as to simulate human natural dentition;

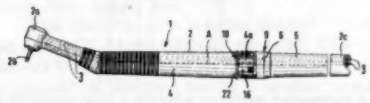
a deflectable tray layer bonded to said hard base structure, said deflectable tray layer being able to be molded to the wearer's oral contours during fitting thereof, whereby said segmented hard base structure may also be laterally adjusted during said fitting to align said prosthetic teeth generally with said mandibular or maxillary ridges.

4,175,323

DENTAL HANDPIECE

Eugen Eibofner, and Heinz Balsys, both of Biberach an der Riss, Fed. Rep. of Germany, assignors to Kaltenbach & Voigt GmbH & Co., Biberach an der Riss, Fed. Rep. of Germany

Filed Nov. 15, 1977, Ser. No. 852,601
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1977, 2736285
Int. Cl.[2] A61C *1/12*
U.S. Cl. 433—126 **10 Claims**



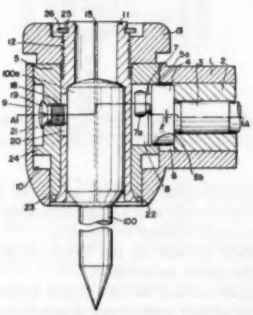
1. A dental handpiece comprising: supply lines running axially inside a longitudinal handpiece sleeve, with said handpiece sleeve and supply lines being divided transversely to form several handpiece sections, said handpiece sections having ends, one of two facing ends of two adjacent handpiece sections having an axially projecting sleeve into which the end of the other handpiece section can be inserted; two facing ends of adjacent handpiece sections having a screw thread each to form a detachable connection; said screw thread being an inside thread of the projecting sleeve forming a pipe-stub like threaded portion of the end inserted in the sleeve of the other handpiece section; an engaging portion; one of two pipe-stub like threaded portions having at least one cutout extending axially from the free end of said handpiece section and forming threaded spring-like tongues; said one of two threaded portions being radially spring-like pretensioned in the unthreaded state of the two adjacent handpiece sections away from the other threaded portion with threads not engaged, said one of two pipe-stub like threaded portions being rotatable relative to said engaging portion of the handpiece section having a threaded portion with at least one cutout about an axis of said handpiece section; said engaging portion having startup surfaces placeable on said threaded portion and radially moving said threaded portion during relative rotation of said threaded portion and said engaging portion against a spring-like pretension towards the thread of the other threaded portion till the threads of the two threaded portions are engaged; said threaded portion having at least one cutout being rotatable relative to its handpiece section about an axis thereof and having engagement means engaging counter engagement means on the last-mentioned handpiece section for pushing together the ends of said two adjacent handpiece sections during the relative rotation of said threaded portion and handpiece section; said engaging means and counter engaging means for pressing together the ends of the two adjacent handpiece sections comprising helical guide slot means in said threaded portion having at least one cutout; and a radial cam located on the handpiece section and projecting into said guide slot means.

4,175,324

DENTAL TREATMENT TOOL

Toshio Arai, Tokyo, Japan, assignor to Kabushiki Kaisha Morita Sanshoku, Japan

Filed Jul. 26, 1977, Ser. No. 819,507
Claims priority, application Japan, Jun. 23, 1977, 52-82611[U]
Int. Cl.[2] A61C *1/10, 5/02*
U.S. Cl. 433—122 **8 Claims**



1. A dental treatment tool comprising:

a casing;

a rotation drive shaft supported in said casing for rotation about an axis of said drive shaft;

a rotation cylinder supported in said casing for rotation about and axial movement along an axis of said rotation cylinder extending perpendicular to said axis of said drive shaft;

said rotation cylinder including means for fixedly supporting a dentral drill;

said rotation cylinder having therein, on the outer periphery thereof, a concave recess defined by two axially extending, circumferentially spaced surfaces;

said rotation cylinder having extending from the outer periphery thereof two shoulders defined by axially spaced surfaces extending transverse to said rotation cylinder axis;

said rotation drive shaft having integral with the inner end thereof a rotation plate having a diameter larger than that of said rotation drive shaft, said rotation plate having an axis eccentrically located with respect to said rotation drive shaft axis;

said rotation plate being positioned between said two shoulders with an outer peripheral surface of said rotation plate in contact with both of said axially spaced surfaces of said shoulders, such that rotation of said rotation drive shaft will cause eccentric rotation of said rotation plate, and contact of said peripheral surface of said rotation plate with said shoulders of said rotation cylinder will cause reciprocating axial movement of said rotation cylinder with respect to said casing;

said rotation plate having integral therewith and extending therefrom a drive pin having a rounded arcuate peripheral surface, said drive pin being located at a position other than the center of said rotation plate; and

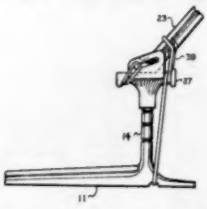
said drive pin being positioned within said concave recess with said rounded arcuate peripheral surface in contact with both of said axially extending, circumferentially spaced surfaces, such that said eccentric rotation of said rotation plate will cause eccentric rotation of said drive pin, and contact of said rounded arcuate peripheral surface with said axially extending, circumferentially spaced surfaces will cause reciprocating rotation of said rotation cylinder through a limited angle about said axis of said rotation cylinder.

4,175,325

DENTAL ARTICULATOR

Edward K. Beckwith, 303 La Marina, Santa Barbara, Calif. 93109

Filed Nov. 25, 1977, Ser. No. 854,523
Int. Cl.² A61C *11/00*
U.S. Cl. 433—60 **3 Claims**



1. In a dental articulator having an upper and lower bow with inner and outer ends and a hinge structure joining the two inner ends, the improvement comprising:

(a) a flat lower surface on the lower bow, which surface supports the entire articulator;

(b) a flat upper surface on the upper bow, which surface supports the entire articulator, when it is inverted;

characterized by said bows being tapered from wide at the hinge end to narrower at the outer end so that plaster masses formed over the base may be removed by sliding them outwardly the upper surface of the lower bow and the lower surface of the upper bow have projecting dovetails that are tapered from wide at the inner end to narrow at the outer end.

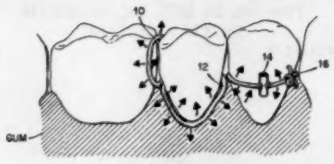
4,175,326

HOLLOW-FIBER DEVICES FOR AND A METHOD OF THE TREAMENT AND DIAGNOSIS OF ORAL DISEASES

Jo M. Goodson, Cambridge, Mass., assignor to Forsyth Dental Infirmary for Children, Boston, Mass.

Filed Oct. 26, 1977, Ser. No. 845,587
Int. Cl.² A61C *19/06*
U.S. Cl. 433—80 **19 Claims**

1. A capillary hollow fiber suitable for diagnostic use in the detection of a dental disease in the oral cavity of a patient, which fiber comprises a flexible, semipermeable, polymeric material having an outside diameter of not greater than 500 microns and a wall thickness of from about 1 to 100 microns, the lumen of the fiber containing a known quantity of an indicator-diagnostic agent wherein the indicator agent is selected from the group of acid-base indicator agents, oxidation-reduction indicators, tooth-corrosive-action indicators and



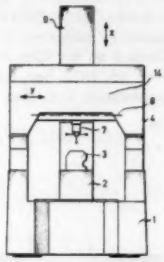
proteinaceous proteolytic-action indicators which provides diagnostic information by undergoing chemical reaction with the products elaborated by the localized disease process in the oral cavity whose diagnosis is desired, the indicator agent capable of diffusing out of the fiber at a rate controlled by the permeability of the fiber.

4,175,327

MEASURING MACHINE

Klaus Herzog, Oberkochen, Fed. Rep. of Germany, assignor to Carl Zeiss-Stiftung, Oberkochen, Fed. Rep. of Germany

Filed Apr. 24, 1978, Ser. No. 898,800
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1977, 2718506
Int. Cl.² G01B *7/02*
U.S. Cl. 33—1 M **4 Claims**

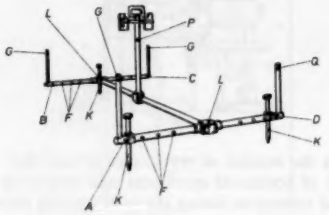


1. In a measuring machine wherein a base supports a workpiece to be contacted by a probe of a measurement head for base-referenced determination of the positional coordinates of the probe-contacted point on the workpiece, and wherein a gantry is movable along spaced parallel ways in the base and on opposite sides of the workpiece, the measurement head being movably carried by the arch of the gantry, the improvement in which drive means for positioning the gantry along said ways is so mounted to the base as to apply gantry-positioning force at an elevation above the workpiece and at the arch region of the gantry, and a gantry-displacement measuring scale fixed with respect to the base and oriented parallel to the direction of such gantry-displacement force.

4,175,328
ARRANGEMENT FOR PRODUCING PHOTOGRAPHIC PICTURES SUITABLE FOR PHOTOGRAMMETRIC SURVEY OF SPATIAL OBJECTS

Helmut Kellner, Wolfsgarten 14, 3406 Bovenden 1, Fed. Rep. of Germany

Filed Jul. 11, 1977, Ser. No. 814,147
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1976, 2631226
Int. Cl.[2] B43L *13/20*; G01C *11/12*
U.S. Cl. 33—1 A **12 Claims**



1. A method for producing photographic pictures suitable for photogrammetric survey of a spatial object, particularly after traffic accidents, comprising the steps of: establishing control points in said spatial object; taking two photographs using central projection with different positions of a projection center; evaluating said photographs by determining image coordinates of said control points and selected object points, said control points being part of a control point system, said system comprising: a reference plane with at least four points having known position coordinates defining a quadrangle, and at least two space points located outside said reference plane having position coordinates relative to said reference plane, at least the position coordinates of one of said space points and the space coordinates of the other of said space points being known; recording image coordinates of said six points and solving transformation equations of collinear transformation of said four image points of the quadrangle onto four points of said reference plane; recording spatial positions of the two projection centers; projecting image coordinates of selected object points onto the reference plane by applying transformation equations for determining transformed image points; forming intersection of two straight lines between the projection center and one of said transformed image points for determining space coordinates of a selected object point.

4,175,329
ATTACHMENT FOR MOTION TRANSLATING MACHINE

Otto K. Schimmel, Scottsdale, Ariz., assignor to Amba Marketing Systems, Inc., Tempe, Ariz.

Filed Mar. 31, 1978, Ser. No. 892,257
Int. Cl.[2] B43L *13/10*; D05B *21/00*; D05C *9/04*
U.S. Cl. 33—23 R **6 Claims**

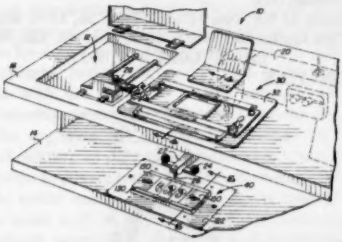
1. In a machine of the type having a motion translating mechanism for moving a workpiece at a first location and in response to movement imparted at a tracing mechanism at a second location, the improvement comprising:

(a) a base including connecting means for attaching said base to said motion translating mechanism at said first location;

(b) locking means carried on said base;

(c) detachable guaging means having an orienting surface corresponding to at least a portion of the workpiece, said detachable guaging means being cooperable with said locking means to detachably secure said guaging means to said base plate whereby said guaging means may be selectively interchanged; and

(d) clamping means associated with said base for securing said workpiece on said base and in engagement with at least the orienting surface of said detachable guaging

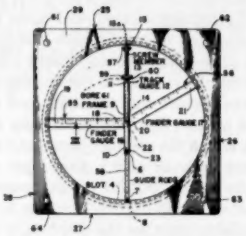


members whereby the workpiece is securable in a work position at said second location.

4,175,330
ADJUSTABLE COMPASS DEVICE

Wayne D. Hermann, 623 N. 3rd St., La Crescent, Minn. 55947

Filed Nov. 20, 1978, Ser. No. 962,227
Int. Cl.[2] B43L *9/04*
U.S. Cl. 33—27 C **5 Claims**



1. An adjustable compass device for making circles and parts of circles of variable diameter, said adjustable compass comprising

an annular slide member having an inner circular surface and an outer circular surface, said slide member having a circular slot formed in its inner surface;

mounting means for rotatably mounting the slide member for free rotation about its axis;

a guide rod having spaced opposite first and second ends, said guide rod having an axial bore formed in its first end and a projection extending from its second end into the slot of the slide member;

a tube-like frame having spaced opposite first and second ends, said frame accommodating the first end of the guide rod in the area of the first end of said frame;

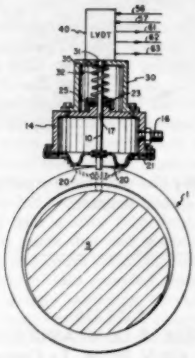
a track guide having guide means for accommodating a marking device, said track guide being affixed to the second end of said tube-like frame and having an internally threaded bore; and

a screw member having spaced opposite first and second ends, the first end being accommodated in the second end of the frame and threadedly coupled in said track guide and the second end being in the slot of the slide member whereby the guide rod, the frame, the track guide and the screw member function as a variable length diameter of the slide member freely rotatable about the axis of said slide member for marking a circle or part of a circle of any diameter smaller than that of said slide member.

4,175,331
SHAFT BEARING WEAR MEASURING APPARATUS

Everett M. Johnson, Fishkill, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Continuation of Ser. No. 745,252, Nov. 26, 1976, abandoned.
This application Jan. 3, 1978, Ser. No. 866,594
Int. Cl.[2] G01B 7/02, 7/31
U.S. Cl. 33—172 E 5 Claims



1. On-line apparatus for measuring the wear of a ship's propeller shaft bearing, comprises determining means for determining the displacement of the ship's propeller shaft in a vertical direction and providing an electrical signal corresponding thereto, the determining means includes a movable member, spacially related to the shaft, moving means connected to the member for moving the member in the vertical direction until the member makes contact with the shaft, said moving means includes an open bottom first housing having a sealed upper opening through which the member passes and a port through which a fluid may enter or exit; a diaphragm affixed to said member and to the bottom portion of said housing forming an expandable chamber within said first housing so that as a fluid enters the expandable chamber the diaphragm is distended in the direction of the shaft, moving the member into contact with the shaft, a supply of fluid, and manually operative means connected to the port in the first housing and to the fluid supply for providing fluid from said supply and for releasing fluid from the expandable chamber, and electrical signal means connected to the movable member for providing the electrical signal in accordance with the position of the movable member; and measurement means connected to the electrical signal means for providing a measurement of the shaft bearing wear in accordance with the electrical signal.

4,175,332
METHOD OF MEASURING DIRECTIONAL PROPERTIES OF SURFACE OF SHAFTS

Yasuo Mikami, Fukushima, Japan, assignor to Nippon Oil Seal Industry Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1978, Ser. No. 884,167
Claims priority, application Japan, Mar. 8, 1977, 52-25190; Jan. 17, 1978, 53-3548
Int. Cl.[2] G01C 5/28
U.S. Cl. 33—174 R 5 Claims

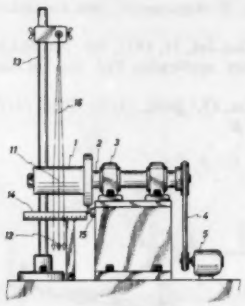
1. A method for measuring directional properties of the surface of a shaft, said method comprising the steps of:

rotatably supporting said shaft with a horizontal rotational axis;

supporting a measuring contact terminal against the surface of said shaft and for horizontal movement;

rotating said shaft in the forward direction;

rotating said shaft in the reverse direction; and

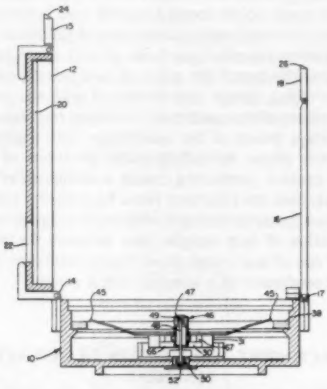


measuring the number of revolutions of said shaft and the amount of horizontal movement said measuring contact terminal undergoes during the shaft rotating steps.

4,175,333
MAGNETIC COMPASS

Melvin G. Kramer, Riverton, Wyo., assignor to The Brunton Company, Riverton, Wyo.

Filed May 16, 1978, Ser. No. 906,427
Int. Cl.[2] G01C 17/04
U.S. Cl. 33—344 6 Claims



1. A magnetic compass comprising in combination:

an annular body having a bottom wall;

an upstanding pivot member including a pivot pin having a spherical end surface at its upper end, said pivot pin being centrally located to project upwardly from said bottom wall;

a needle assembly mounted on said pivot member including a centrally located pivot mount provided with an axially extending pin-receiving bore therein terminating in a downwardly facing concave seat at the upper end of sid pivot mount, said concave surface resting upon the upper spherical end surface of said pivot pin, pointer arms extending radially in diametrically opposite directions from a location on said pivot mount vertically spaced substantially beneath said concave seat, and magnets disposed beneath said pointer arms; and

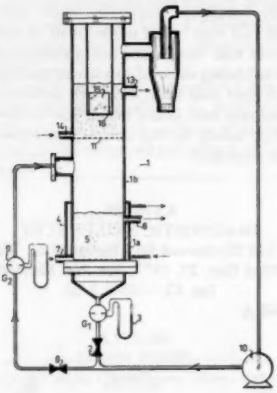
an azimuth ring disposed in outer spaced concentric relation to said pivot mount.

4,175,334

METHOD OF AND APPARATUS FOR FREEZE-DRYING PREVIOUSLY FROZEN PRODUCTS

Henri Gibert, Montpellier, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Dec. 30, 1977, Ser. No. 866,012
Claims priority, application France, Dec. 31, 1976, 76 39864
Int. Cl.[2] F26B 5/06
U.S. Cl. 34—5 11 Claims



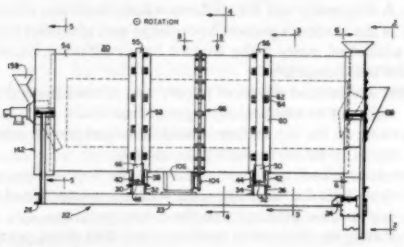
1. A method of freeze-drying a previously frozen product comprising fluidising a finely divided solid particulate water vapour adsorbent by placing said absorbent in suspension in a carrier gas having a low moisture content in an enclosure, placing said frozen product in said fluidised adsorbentm adjusting the temperature of the fluidised adsorbent and the partial pressure of water vapour in said enclosure to levels at which frozen water contained in said product will sublime.

4,175,335

MACHINE FOR DRYING GRANULAR MATERIALS

Arthur C. Avril, P.O. Box 17087, Cincinnati, Ohio 45217

Filed Dec. 8, 1977, Ser. No. 858,618
Int. Cl.[2] F26B 11/04
U.S. Cl. 34—128 9 Claims



1. A machine for drying and mixing sand and gravel which comprises an outer cylinder having an inlet end and an outlet end, an inner cylinder having an inlet end and an outlet end, the inner cylinder being mounted inside of and coaxially with the outer cylinder, the inlet end of the outer cylinder being adjacent the outlet end of the inner cylinder, the outlet end of the outer cylinder being adjacent the inlet end of the inner cylinder, means for rotating the cylinders in unison, means for introducing moist sand into the inlet end of the inner cylinder, means for introducing gravel into the inlet end of the outer cylinder, means for moving the sand along the inner cylinder toward the outlet end of the inner cylinder in heat exchange relation with the inner cylinder, a burner at the outlet end of the inner cylinder directing products of combustion into the outlet end of the inner cylinder to pass therealong and heat the moist sand in the inner cylinder to evaporate water therefrom, a vent stack communicating with the inlet end of the inner cylinder for receiving and discharging the products of combustion, means for directing the heated sand from the outlet end of the inner cylinder into an inlet end portion of the outer cylinder to mix with the gravel to form a sand-gravel mixture, impeller assembly means mounted on the interior of the outer cylinder for engaging the sand-gravel mixture to raise the sand-gravel mixture as the cylinders rotate to cause the sand-gravel mixture to advance along a space between the cylinders toward the outlet end of the outer cylinder and to cascade against an outer wall of the inner cylinder, and catch plate assembly means mounted on the outer wall of the inner cylinder and extending outwardly therefrom to catch the sand-gravel mixture as the sand-gravel mixture cascades against the outer wall of the inner cylinder to hold the sand-gravel mixture in heat exchange relation to the inner cylinder as the cylinders revolve.

4,175,336

BRIDGE PLAYING APPARATUS

Theodore G. Heck, 10 Haddon Pl., Fort Washington, Pa. 19034

Filed Feb. 24, 1978, Ser. No. 880,769
Int. Cl.[2] G09B 19/22; A63F 1/06
U.S. Cl. 35—8 B 9 Claims

1. Bridge playing apparatus adapted for use with the bridge column appearing in certain publications such as newspapers and the like comprising:

(a) an outer housing having a pair of windows cut therethrough, said housing also having a pair of opposed wall members which together define an interior channel in said housing;

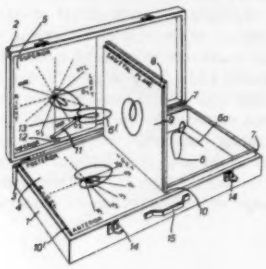
(b) a first inner member slidably disposed within said channel, and communicating with one of said housing windows to selectively cover and uncover certain bridge playing indicia printed in the bridge column, and

(c) a second inner member slidably disposed within said channel and communicating with the other window in said housing to selectively uncover and cover certain other bridge playing indicia printed in the bridge column, said first and second inner members being disposed in a common plane for sliding movement there-along in said channel.

4,175,337
APPARATUS FOR ASSISTING THE UNDERSTANDING OF ELECTRO-CARDIOGRAPHY AND VECTOR-CARDIOGRAPHY

Cezar Benjo, Rua Santa Clara No. 50, sala 808, Rio de Janeiro, Brazil

Filed Jun. 6, 1978, Ser. No. 913,168
Int. Cl.[2] G09B *23/28*
U.S. Cl. 35—17 13 Claims

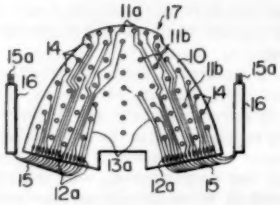


1. An apparatus for assisting the understanding of electrocardiography and vectorcardiography comprising first and second mirrors for placement in substantially horizontal and vertical planes representative, respectively, of the horizontal and frontal planes of electrode placement on a patient, said first horizontal mirror being marked with lines representing the leads of the principal horizontal electrodes on the patient's body, said lines emanating from a generally central point of said first mirror, and said second frontal plane mirror being marked with lines emanating from a generally central point of said second mirror and indicating the leads of the frontal plane electrodes on the patient's body; a series of standard three dimensional vector-cardiographic loops representative of normal and pathological heart conditions; a support portion on each said loop; and support means adapted for receiving said support portion of a selected one of said loops between said mirrors, substantially in a position in which an observer may view the reflection of the projection of said loop in either one of said first and second mirrors with the starting point of said loop coinciding with said central points of said mirrors.

4,175,338
ARTIFICIAL PALATE FOR USE IN DYNAMIC PALATOGRAPHICAL SPEECH RESEARCHES AND IMPROVEMENTS AND METHOD OF FABRICATING THE SAME

Kiyotoshi Takinishi, and Junichi Hattori, both of Tokyo, Japan, assignors to Rion Co., Ltd., Tokyo, Japan

Filed Sep. 27, 1977, Ser. No. 837,039
Claims priority, application Japan, Sep. 29, 1976, 51-117009
Int. Cl.[2] G09B *19/04*
U.S. Cl. 35—35 R 5 Claims



1. An artificial palate for use in dynamic palatographical speech research and which is of the type comprising a structure to be intimately fitted to a particular user's palate, said structure including a plurality of sensing electrodes supported by said structure so as to be contacted by a user's tongue during use, lead wires each connected at one end to a respective electrode, the other ends of said wires extending from at least an end portion of the structure, and means on the structure for mounting the structure within the user's mouth, the improvement wherein said structure comprises:

a shell body formed of electrically insulative material in the shape of a particular user's palate, and

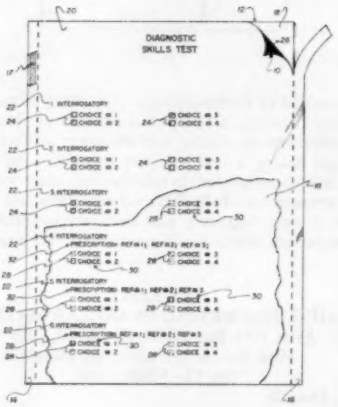
a base board formed separately of said shell body of flexible electrically insulative material, with said lead wires formed on said base board in the form of a printed circuit applied with said base board being substantially flat,

said base board being secured to a lower surface of said shell body such that said lead wires are sandwiched therebetween, and said base board being held in the shape of the user's palate solely by the connection between said base board and said shell.

4,175,339
DIAGNOSTIC SKILLS TEST

S. E. Jones, 7120 Birchwood Dr., Dallas, Tex. 75240

Filed Dec. 27, 1977, Ser. No. 856,630
Int. Cl.[2] G09B *3/02*
U.S. Cl. 35—48 A 4 Claims



1. A diagnostic test for students which facilitates determination of the student's present knowledge and identifies materials for additional study if the student has insufficient knowledge, which test comprises:

first and second sheets of paper, said second sheet disposed adjacent to and underlying said first sheet;

writing on the top surface of said first sheet posing interrogatories to be answered by the student;

predetermined spaces provided on the top surface of said first sheet for such answers, which predetermined spaces are in close proximity to the interrogatories;

a coating on the bottom surface of said first sheet, portions of said coating being transferrable to underlying portions of the top surface of said second sheet upon the application of pressure to corresponding portions of the top surface of said first sheet;

predetermined answer spaces on the top surface of said second sheet which register with corresponding predetermined answer spaces on the top surface of said first sheet, whereby a student responding to the interrogatories written on the top surface of said first sheet by selectively applying pressure to portions of said predetermined answer spaces on the top surface of said first sheet to indicate one or more answers will cause portions of the coating on the bottom surface of said first sheet to be transferred to

portions of said predetermined answer spaces on the top surface of said second sheet;

indicia within or in close proximity to said predetermined answer spaces on the top surface of said second sheet which indicate the correct answers to the interrogatories contained on the top surface of the first sheet, whereby it can be determined whether the student's answers represented by said portions of transferred coating are correct or incorrect by comparison with said indicia;

writing on the top surface of said second sheet prescribing one or more source references of information which will supply remediation for incorrect responses to the interrogatories; and

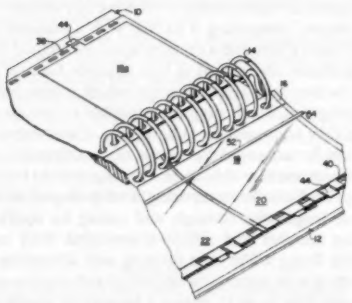
removable binding means for temporarily binding margins of said first and second sheets in abutment to prevent visual inspection of the top surface of said second sheet until said means are removed permitting separation of said paper sheets.

4,175,340

FORM BOOK

Howard E. Deutch, 6826 Casselberry Way, San Diego, Calif. 92119

Filed Sep. 30, 1977, Ser. No. 838,060
Int. Cl.² B42D *1/08*
U.S. Cl. 35—53 **14 Claims**



1. A device for holding elements containing information which are selectively combinable to form a compiled document having a plurality of pages, the device comprising:

a binder having a plurality of rings;

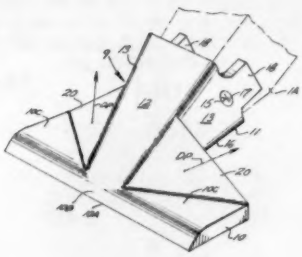
a plurality of first and second element holding means attached to the rings of said binder, each of said second element holding means being adapted to hold a plurality of elements arranged in a plurality of stacks, the stacks being arranged in juxtaposition with each other with one edge of each element being attached to the rings of said binder, said second element holding means including holding means for holding the top element in each stack in a predetermined position, the elements in each stack being movable in order from said second element holding means to a preceding one of said first element holding means to position a desired element as the top element thereby forming one page of the compiled document, each of said first element holding means including means for holding elements moved from the succeeding second element holding means, the compiled document being formed by selectively arranging the elements in a plurality of said second element holding means.

4,175,341

SUBSURFACE CUTTING TOOL FOR A TRACTOR RIPPER SHANK

William M. Mortimore, 38474 McKenzie Hwy., Springfield, Oreg. 97477

Filed Jan. 3, 1978, Ser. No. 866,549
Int. Cl.² E02F *9/28*
U.S. Cl. 37—2 R **2 Claims**



1. A tool for cutting and lifting buried wooden debris for attachment to the ripper shank of a tractor, said tool comprising,

a blade block for subterranean travel in a path substantially parallel to the ground surface, said blade block having a forward substantially straight cutting edge extending transversely across the blade block and disposed normal to the blade block path,

a socket secured to said blade block and extending rearwardly and upwardly from said edge relative to the path of blade block travel, said socket adapted to lockably receive the lower end of the shank,

debris deflector plates integral with said blade block and socket, each of said plates inclined upwardly and rearwardly along two axes so as to provide plate surfaces serving to elevate the severed material to the ground surface, and

said socket and said plates jointly extending the length of the blade block to provide surfaces acting to elevate all of the debris severed by the blade block cutting edge.

4,175,342

SUCTION DREDGER

Jan de Koning, Amsterdam, and Gerrit H. van Zeggelaar, Utrecht, both of Netherlands, assignors to Goyo Ballast Company Ltd., Tokyo, Japan

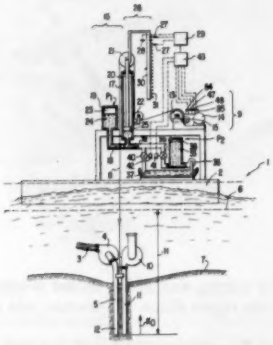
Continuation-in-part of Ser. No. 517,028, Oct. 22, 1974, abandoned, which is a continuation of Ser. No. 327,402, Jan. 29, 1973, abandoned. This application Feb. 23, 1976, Ser. No. 660,044

Claims priority, application Netherlands, Jan. 28, 1972, 7201218

Int. Cl.² E02F *3/88*
U.S. Cl. 37—58 **7 Claims**

1. A suction dredger comprising a vessel and a suspension conveying conduit provided with a pump and having a nozzle adapted to be inserted in the bottom below the vessel and suspended by means of at least one cable of a lifting device on the vessel, said lifting device including a winch drum provided with control means for hauling and veering cable in order to adjust the depth of the nozzle with respect to the vessel, cable length variator means connected with said cable between said lifting device and said nozzle and comprising at least one piston which is movable in a cylinder and which has a travel corresponding with the variations of the rise and fall of said vessel as a result of sea level movement, said variator means also including an accumulator connected with said cylinder and a quantity of liquid within said cylinder and accumulator and a quantity of compressible gas trapped within said accumulator whereby the disposition of the working stroke within said

cylinder determines the variations in the tension on said cable, sensing means for picking up the travel of the piston, a conduit communicating with the cylinder for controllable supplying and discharging liquid to said accumulator and cylinder whereby selectively to increase and decrease said quantity of liquid, and control means for controlling the supply and discharge of the liquid in dependence on the travel picked up by the sensing means to shift the movements of said piston into a



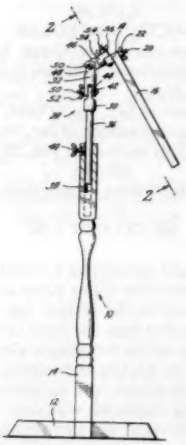
prescribed stroke only when said travel exceeds first maximum and/or minimum positions within said cylinder in which said first maximum and minimum positions are widely spaced on opposite sides of the central position of said piston within said cylinder, the control means including means for actuating the control means of the winch drum only when the travel of the piston exceeds second maximum and/or minimum positions which are beyond said first positions.

4,175,343

NEEDLEWORK STAND

Margaret R. Mathews, Rte. 3, Box 485, Cut-in-Shoot, Tex. 77302

Filed Nov. 25, 1977, Ser. No. 854,705
Int. Cl.[2] D06C 3/08
U.S. Cl. 38—102.1 **3 Claims**



1. A stand for holding needlework stretcher frames comprising:

base means for supporting said stand in a free standing position;

bracket means comprising an elongated bar provided with a plurality of openings for selectively releasably attaching needlework stretcher frames of various sizes;

support means for supporting said bracket means from the upper end of said base means,

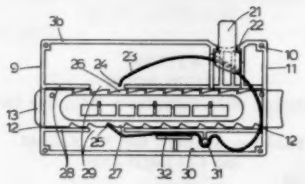
said support means including lockable vertical adjustment means and lockable universal joint means, whereby said needlework stretcher frame may be selectively rigidly positioned at any desired height and angle with respect to said base means.

4,175,344

VIEWER FOR THE SUCCESSIVE VIEWING OF A NUMBER OF TRANSPARENT IMAGES

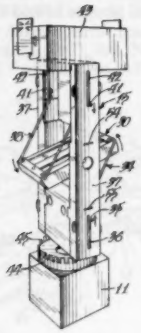
Izak (Piet) Cohen, Amsterdam, Netherlands, assignor to Sales Promotion Spits B.V., Amsterdam, Netherlands

Filed Dec. 29, 1977, Ser. No. 865,779
Claims priority, application Netherlands, Jun. 10, 1977, 7706434
Int. Cl.[2] G02G 27/22
U.S. Cl. 40—364 **18 Claims**



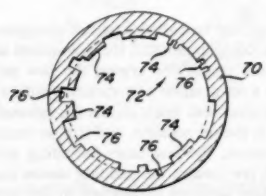
1. A viewer for the successive viewing of a number of transparent images, comprising a casing with a viewing aperture provided with a lens and a counter-aperture aligned therewith which apertures are formed in two opposite faces of said casing, and further comprising a carrier which is detachably fitted in the casing and which supports a number of images in such a way that they are visible from both sides of said carrier, which carrier can be advanced by means of an advancing member that is connected movably to said casing and that is operated manually, said carrier comprising a strip-shaped slide which can move lengthwise through said casing by operating said advancing member and which is provided with means for detachably fixing a film strip thereon, said advancing member co-operating with a spring having a first end portion which can engage said slide so as to impart a lengthwise displacement to said slide, the other end portion of said spring being in engagement with said slide, so as to accurately fix said slide in its successive positions, a manually operated advancing member in the form of a push button which can be moved up and down in said casing, said slide being provided on its opposite longitudinal edges with feed teeth and detaining teeth, respectively, the pitch of said feed teeth and detaining teeth corresponding to the pitch width of an image of said film strip, while the first end portion of said spring, as a result of an elastic deformation of said spring upon depression of the push button engaging said spring, meshes with a cavity between two successive feed teeth on the one slide edge, displaces said slide positively in the working direction during its further elastic deformation, and during its recoil, when said push button has been released, initially takes said slide along in the direction opposite to its working direction due to the friction between said first end portion of said spring and the slide edge involved, while the other end portion of said spring continuously engages the detaining teeth on the other slide edge and allows displacement of said slide in the working direction but during the return motion of said slide meshes with a cavity between successive detaining teeth, thus locking said slide against a further return displacement.

4,175,345
DISPLAY DEVICE
Robert K. Rutchik, Vernon Hills, Ill., assignor to Rapid Mounting & Finishing Company, Chicago, Ill.
Filed Apr. 14, 1978, Ser. No. 896,493
Int. Cl.[2] G09F *11/02*
U.S. Cl. 40—473 14 Claims



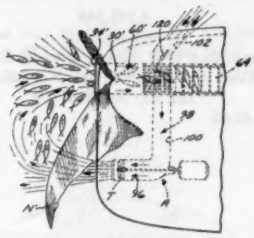
1. In a display device having a base, a first display, and rotary drive means carried by the base and drivingly connected to said first display to cause rotation thereof about a first axis, the improvement comprising:
- first motion translating means carried by said base;
- second motion translating means carried by said first display in operative association with said first motion translating means;
- a control lever having a midportion pivotally mounted to said first display for reciprocable pivoting about a second axis transverse to said first axis;
- first connecting means responsive to movement of said second motion translating means to reciprocably pivot said control lever about said second axis;
- a second display adjacent said first display and
- second connecting means connected between a portion of said control lever spaced from said second axis and said second display for causing reciprocation of said second display relative to said first display while said first and second displays are being rotated concurrently about said first axis.

4,175,346
FIREARM AND BULLET IDENTIFICATION
Michael D. Zemsky, P.O. Box 2965, Arlington, Va. 22202
Filed Sep. 16, 1977, Ser. No. 833,970
Int. Cl.[2] F41C *21/00*; F41F *17/10*
U.S. Cl. 42—76 R 23 Claims



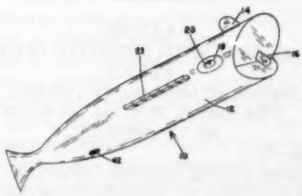
1. A firearm which will mark a bullet fired therefrom with identifying markings, comprising:
- (a) a firearm having a barrel with a bore;
- (b) marking elements formed from the material of said bore, said marking elements being an integral part of said bore surface; and
- (c) said marking elements arranged according to a predetermined code so as to indicate the identifying number of that firearm whereby a bullet fired from said firearm will have markings applied to its surface corresponding to the marking element array which markings will indicate the identification number of said firearm.

4,175,347
STERN FISHING SYSTEM
Mario J. Puretic, 259 6th Ave. North, Tierra Verde, Fla. 33715
Continuation-in-part of Ser. No. 784,278, Apr. 4, 1977, Pat. No. 4,125,955. This application Jun. 8, 1977, Ser. No. 804,748
Int. Cl.[2] A01K *81/04*
U.S. Cl. 43—6.5 6 Claims



1. Fishing apparatus for use with a fishing boat, said apparatus comprising:
- an aperture through which fish are urged;
- a water passage in said boat forwardly of said aperture to receive fish from said aperture;
- a conveyor that receives fish from said water passage;
- a power-driven thruster pump having an impeller disposed in said water passage to direct water passing through said water passage;
- with said water passage being in communication with said aperture whereby rotation of said thruster impeller creates a suction pressure within said aperture to urge said fish therethrough;
- a suction grill in said water passage over which the fish pass to reach said conveyor;
- a valve disposed in said water passage upstream of said impeller to control the magnitude of the suction pressure at said suction grill.

4,175,348
ILLUMINATED FISHING LURE WITH MAGNETIC SWITCH
William E. Ray, P.O. Box 104, Korbel, Calif. 95550
Filed Jul. 12, 1978, Ser. No. 924,047
Int. Cl.[2] A01K *85/01*
U.S. Cl. 43—17.6 4 Claims



1. A fishing lure comprising:
- a hollow body configurated to simulate a fish;
- translucent eyes on opposite sides of said body;
- a pair of light emitting diodes positioned in said body to be seen through said eyes;
- a source of electricity in said body;

an electric circuit connecting said source to said light emitting diodes; and

a switch in said circuit in condition to be opened and closed by contacting said body, said switch comprising:

a magnetic reed switch;

a non-magnetic tube mounted adjacent said magnetic reed switch;

magnetic members carried at each end of said tube; and

a permanent magnet in said tube;

said tube and switch being so positioned relative to each other that when said magnet is at one end of the tube the switch is closed thereby, and when said magnet is at the other end of said tube the switch is open.

4,175,349

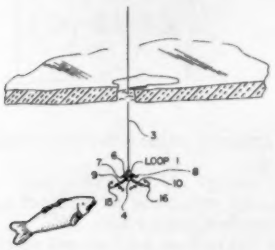
FISH LURE

Derryl D. Engel, Box 1908, Leduc, Alberta, Canada

Filed Jun. 30, 1978, Ser. No. 920,732

Int. Cl.[2] A01K *85/04*

U.S. Cl. 43—42.02 **2 Claims**



1. A fish lure, comprising

a closed loop having a top part affixed to a fishing line, a spaced opposite bottom part and an intermediate part between the top and bottom parts;

a top plate-like strip mounted on the loop in the intermediate part thereof and extending substantially diametrically across the loop substantially perpendicularly to the line, said top strip having spaced opposite ends extending beyond and spaced from the loop on diametrically opposite sides thereof, said top strip being essentially planar and bent in the areas of its opposite ends to form obtuse angles opening away from said line; and

a pair of bottom plate-like strips mounted on the loop in the bottom part thereof and extending at an angle with each other, each of said bottom strips having spaced opposite first and second ends and being mounted on the loop at its first end in angular relation with said top strip, each of said bottom strips being essentially planar and curving slightly at its second end and affixed at its second end to a fish hook.

4,175,350

ANIMAL TRAP WITH SENSITIVE TRIGGERING DEVICE

Joseph L. Preston, 219 Orlemann Ave., Oreland, Pa. 19075

Filed Mar. 31, 1978, Ser. No. 892,211

Int. Cl.[2] A01M *23/24*

U.S. Cl. 43—82 **10 Claims**

1. An animal trapping apparatus, comprising:

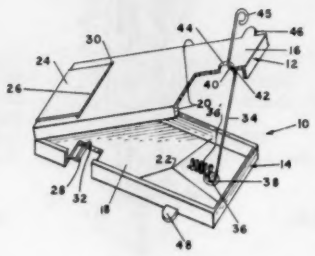
a pair of box-shaped jaw members each having vertical walls that have contacting surfaces that are in physical contact with one another,

a means connected to, and surrounding a pair of adjacent end portions of said jaws tending to bias said walls of said jaws into said surface to surface contacting position,

said other opposite end portions of said jaws having a trigger in the form of a rod whose entire length is of a cylindrical cross shape configuration, said trigger rod being positioned to extend between said last mentioned jaw portions to retain the jaw in an open position against the force of said biasing means,

one end portion of said rod being mounted on an inner dished out base portion of one of said box-shaped jaw members for pivotal clockwise and counter clockwise rotary movement about a vertical axis,

another oppposite end portion of said cylindrical rod having a bent portion which forms a catch of said trigger,



a wall forming a cylindrical passageway in the other one of said box-shaped jaw members that is of a size sufficient to allow the free passage of the rod therethrough and

said bent catch portion of the cylindrical rod being bent to an angle sufficient to engage an edge portion of the wall of said passageway and thereby provide a sensitive triggering means for holding said jaw members in an open trigger set position.

4,175,351

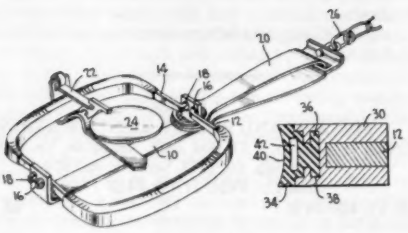
PADDED JAW ANIMAL TRAP

Anthony J. Souza, Lancaster, Pa., assignor to Woodstream Corporation, Lititz, Pa.

Filed Dec. 19, 1977, Ser. No. 862,029

Int. Cl.[2] A01M *23/26*

U.S. Cl. 43—90 **27 Claims**



1. In an animal trap including a pair of elongated jaw means for releasably holding an animal, the jaw means including jaw faces, an actuator means for urging the jaw means about a pivot axis from a set position to a sprung position wherein the jaw faces are juxtaposed, latch means for releasably retaining the jaw means in the set position, and trigger means for releasing the latch means, the jaw faces including padding means carried by each jaw means, the padding means including resiliently padded face portions juxtaposed in the sprung position of the trap, said padding means having a compressive resistance in a direction from said face portion to said jaw face, each of the face portions of the padding means extending beyond its respective jaw face of the jaw means towards the other jaw face in the sprung position, the improvement comprising:

absorber means defining an intermediate portion of said padding means interposed between said face portion and said jaw face of each jaw means, said absorber means

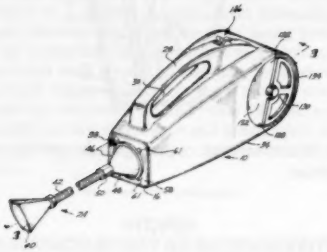
having a lower compressive resistance than said padding means.

4,175,352

SPRING POWERED, PORTABLE, HAND HELD SUCTION AND BLOWER APPARATUS

Richard E. Catlett, 1011 S. Peabody St., Port Angeles, Wash. 98362

Filed Oct. 31, 1977, Ser. No. 847,132
Int. Cl.[2] A01M *1/06;* A47L *5/24*
U.S. Cl. 43—139 5 Claims



1. A portable, hand held, air suction and blower apparatus, comprising:

(a) a body having front and rear end portions;

(b) said body front end portion including a transverse front face having an air inlet opening and a substantially smaller air outlet opening aligned with said air inlet opening;

(c) a tangential fan journaled in said body rear end portion for rotation about an axis generally parallel to said transverse front face, for drawing air into said body through said inlet opening and then forcing such same air forwardly out of said body through said outlet opening;

(d) a manually energized flat spiral spring motor mounted within said body, said motor being geared to said fan for rotating said fan; and

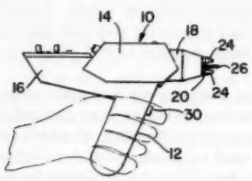
(e) a diffuser detachably connectable to said body front end portion for directing air into said body through said inlet opening.

4,175,353

TOY SIMULATED RAY GUN

Vaughn A. Pickett, 1684 Sacramento St., Berkeley, Calif. 94702

Filed Jan. 3, 1978, Ser. No. 866,753
Int. Cl.[2] A63H *33/26*
U.S. Cl. 46—227 11 Claims



1. A toy gun device for producing controllable audio and visual effect simulating a fictitious "ray" type weapon, said device comprising:

a body in the general shape of a hand gun having a handle attached to a central section with a barrel-like front end portion;

power means in said body;

lamp means at said front end portion;

audio speaker means in said central section;

circuit means connected to said power means including audio generation means connected to said speaker means and said power means and including control means for producing a continuously warbling vibrato sound at a preselected level and frequency, and lamp control means for actuating said lamp means to flash on and off during the warbling sound produced by said audio generation means;

and trigger means on said handle for simultaneously activating said lamp control means and said audio generation means to simulate the firing of said gun-like toy device.

4,175,354

PLANT GROWING DEVICE

Clarence A. Anderson, 724 Beechnut La., Martinsville, Va. 24112

Filed May 24, 1976, Ser. No. 689,564
Int. Cl.[2] A47G *7/02;* A01G *27/00*
U.S. Cl. 47—39 3 Claims

1. A device for promoting plant growth by rotating a plant container and delivering water to a plant within said container, comprising:

(a) a base having an upper section and a lower section, said upper section being rotatably disposed with respect to said lower section;

(b) means for controllably rotating said upper section relative to said lower section;

(c) water supply containment means including a chamber defined in said lower section by a horizontally-disposed intermediate wall dividing the interior of said lower section into upper and lower chambers, said lower chamber containing a supply of water therein; and means for replenishing the water in said lower chamber; and

(d) means cooperating with said rotating means for delivering water from said containment means to said plant container, said water delivering means comprising:

(a) a water delivery tube extending externally of said plant container and having one end extending into said water supply containment means, the other end of said tube terminating at a point adjacent to said plant container such that water is delivered to said plant;

(b) a flexible elongated tubular member disposed within said water supply containment means, one end of said tubular member being anchored to said water containment means so that said water has free access to the interior of said tubular member, and the other end of said tubular member being attached in a fluid-communicating manner to the end of said delivery tube extending into said water supply containment means;

(c) a roller member in rotatable depressing engagement with the upper, outer surface of said tubular member to compress the area of said tubular member below said roller to provide pressure for forcing said water through said tubular member into said water delivery tube; and

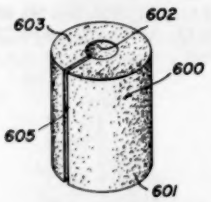
(d) means coupling said roller member to said rotatable upper section such that said roller member depresses said

tubular member during rotational movement of said upper section.

4,175,355
ROOTING MEDIA AND METHODS OF MAKING THE SAME

Richard R. Dedolph, Naperville, Ill., assignor to Gravi-Mechanics Co., Naperville, Ill.

Division of Ser. No. 712,393, Aug. 6, 1976, which is a continuation-in-part of Ser. No. 474,269, May 29, 1974, Pat. No. 3,973,353. This application Jul. 28, 1978, Ser. No. 928,986
Int. Cl.[2] A01G 7/00
U.S. Cl. 47—64 **19 Claims**



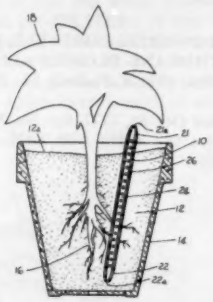
1. A rooting medium for use in plant propagation and growing comprising a resilient, integral body of spongy open-celled hydrophilic polymer forming a first essentially continuous phase extending throughout said body and having passages therethrough forming a second essentially continuous phase extending throughot said body, a quantity of particles of soil mix distributed throughout said body of spongy polymer and held thereby with a substantial portion of the surface area of said particles of soil mix exposed and in communication with said passages, the exposed particles of soil mix providing colloidal contact exchange surfaces in communication with said passages and having collectively a porosity maintenance capacity and a water holding capacity and an ion exchange capacity and and a pH buffering capacity, said passages facilitating the growth of roots through said body and against the exposed surfaces of said particles of soil mix and the contact exchange surfaces provided thereby so as to effect direct ion uptake therewith, said passages also providing ready entry for water and air throughout said body and against the exposed surfaces of the particles of soil mix and the roots growing in said passages, whereby to provide a highly advantageous rooting medium for growing plants.

4,175,356
PLANT AERATOR TUBE

Donovan J. Allen, Rte. 4, Berry Rd., Greer, S.C. 29651

Filed Oct. 31, 1977, Ser. No. 846,925
Int. Cl.[2] A01G 27/00
U.S. Cl. 47—66 **2 Claims**

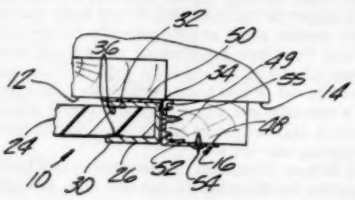
1. An aerator tube for delivering air to the root system of an associated plant surrounded by a support media comprising:
- an elongated tubular member having opposed ends;
- a central axial bore extending generally between said ends;
- at least one of said ends tapering inwardly toward the central axis of said tubular member and terminating at a substantial point for being inserted in said media;
- a plurality of radial openings formed in a sidewall of said tubular member spaced generally along the entire length thereof communicating the interior of said axial bore with the exterior surrounding said tubular member;
- a number of said openings being disposed below the surface of said support media when implanted in said media so that air from above said media level is delivered and distributed at different levels to the root system supported in said media; and
- the other of said opposing ends being tapered inwardly toward the center of said tubular member terminating substantially at a point, said axial bore extending through both of said tapered opposing ends opening outwardly therefrom.



4,175,357
PROTECTIVE ENCLOSURE FOR BUILDING OPENINGS

Marvin L. Goldhaber, 1005 Talbot, Huntington Woods, Mich. 48070

Continuation-in-part of Ser. No. 423,273, Dec. 10, 1973, Pat. No. 3,978,614. This application May 16, 1975, Ser. No. 578,083
Int. Cl.[2] E05C 9/00; E06B 3/30, 7/00
U.S. Cl. 49—395 **4 Claims**



1. A protective enclosure for a building opening, said enclosure comprising:
- a peripheral frame member circumscribing said opening, said frame member having a Z-shaped cross section including first and second parallel walls connected by a transverse wall, the inner surfaces of said walls adapted to abut a complementary shaped edge of said building openings;
- first and second fastening means, respectively, extending through said transverse wall and said first wall for securing said frame member to said edge of said building opening;
- a transparent shielding window unit comprising a peripheral metal member having an inner channel; and a transparent shielding material, the edges of which are mounted in said channel and enclosed by said peripheral member, said shielding material being fabricated from a plastic material of sufficient strength to prevent the breakage thereof by the application of a manual force, said transparent shielding window unit being carried by said frame and movable from a first opened position to a second closed position wherein the peripheral side edge of said metal member abuts said first wall to cover said second fastening means, and the peripheral bottom edge of said metal member snugly engages said transverse wall to cover said first fastening means;
- locking means for securing said unit to said frame when said unit is in said closed position, said locking means being disposed on the inside surface of said frame and cooperat-

ing with said unit and said frame to prevent the opening of said unit;

hinge means extending along one edge of said unit for pivotally attaching said one edge of said unit to an edge of said frame member such that said unit may be moved toward and away from said frame member to open and close said building opening; said hinge means comprising:

a first element carried by said one edge of said frame and extending the full length of the adjacent edge of said unit, said first element having first and second spaced, lengthwise recesses;

a second hinge element integrally formed to the lengthwise edge of said unit, said hinge element having a pivot member of a circular configuration extending the full length thereof, said pivot member being pivotally received within one of said recesses to permit said unit to be pivoted with respect to said first hinge element; and

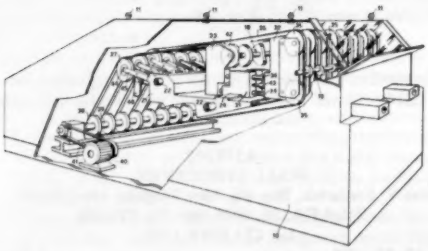
said second hinge element having a second non-circular projection receivable in the other of said recesses to lockingly secure said unit to said hinge when said unit is pivoted toward said frame to enclose said fastening means.

4,175,358

PLUNGE-GRINDER, ESPECIALLY FOR GRINDING THE CAMS OF ENGINE TIMING SHAFTS

Ido Bischeri, Via F.lli Rizzi 1, Proserpio (Como), Italy

Filed Dec. 15, 1977, Ser. No. 860,930
Int. Cl.² B24B *17/00*
U.S. Cl. 51—142 **4 Claims**



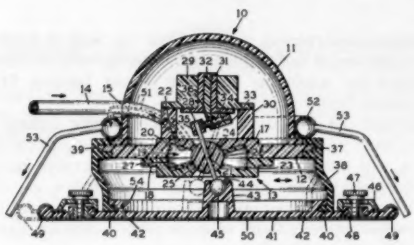
1. A plunge-type grinding machine for grinding cams of a camshaft comprising a baseplate having a front end and a rear end, a table with means for rotatably supporting a camshaft, means adjustably securing said table on said baseplate to facilitate movement of said table in a direction perpendicular to the axis of a camshaft to be rotatably supported thereon, a stationary cross-piece mounted on said baseplate and having means for rotatably supporting a pattern piece generally parallel to the camshaft with cams to be ground, motive and drive-transfer means for rotating the camshaft with cams to be ground and the pattern piece in phase with each other, and a plurality of independent machining units carried by said cross-piece, said machining units being equal in number to that of the cams of the camshaft to be subjected to a grinding operation, each of said independent machining units including a front head, a rear head, and a central supporting member disposed between said front and rear heads associated therewith, said front and rear heads being rigidly connected to each other by bars passing through one of said central supporting members in reciprocating sliding relationship therewith and extending perpendicular to the axis of a camshaft to be subjected to a grinding operation whereby said front and rear heads of each of said independent machining units may be moved toward and away from a camshaft to be subjected to a grinding operation, each of said rear heads carrying an idle roller and the respective central supporting member associated therewith being movable parallel to the axis of the camshaft to be subjected to a grinding operation whereby said idle rollers may be maintained in cam-follower relationship with cam sections of the pattern piece and thus move said independent machining units toward and away from the cams of a camshaft in a controlled manner, each of said front heads carrying pair of idler pulleys, pulley means disposed at the rear end of said baseplate, a grinding tape extending in a closed loop around said pair of idler and said pulley means to present a tightened rectilinear section at the front end to perform a cam grinding operation, hydraulic-jack means for thrusting said front and rear heads towards a machining position in which the respective idle rollers are in cam-follower contact with corresponding cam sections of the pattern piece and the rectilinear sections of the respective grinding tapes are in machining contact with a corresponding cam of a camshaft to be ground.

4,175,359

FLUID POWERED ORBITAL WET SANDER AND THE LIKE

Walter D. Teague, Jr., Tweed Blvd., Nyack, N.Y. 10960, and Arthur T. Sempliner, 37-04 Van Nostrand Pl., Douglaston, N.Y. 11363

Filed Nov. 7, 1977, Ser. No. 848,806
Int. Cl.² B24B *23/00*
U.S. Cl. 51—170 MT **10 Claims**



1. A fluid-driven positive displacement nutating action abrading-type appliance, which comprises

(a) a motor housing,

(b) a wobble plate mounted in said housing for universal tilting movement within predetermined limits,

(c) means communicating with said housing providing for ingress and egress of fluid for driving said wobble plate,

(d) an angularly disposed, orbitally movable rod-like output element carried by said wobble plate,

(e) a support structure associated with said motor housing and being relatively rigid in vertical compression and relatively resilient in the transverse direction,

(f) an abrading-type utilization device mounted by said support structure in spaced relation to said motor housing, and

(g) means forming a direct universal coupling between said output rod and said utilization device whereby said utilization device is positively displaced through an orbital path while being restrained against rotation by said support structure.

4,175,360

COFFERED CEILING SYSTEM

Gerard E. Mulvey, 57 Mobile Dr., Toronto, Ontario, Canada

Filed May 2, 1977, Ser. No. 793,133
Claims priority, application Canada, Feb. 25, 1977, 272724
Int. Cl.² B66B *9/00*; E04H *6/06*
U.S. Cl. 52—28 **29 Claims**

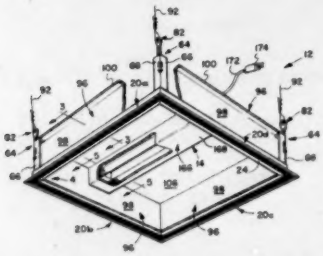
1. A suspended ceiling structure closing a ceiling void in a building which comprises a plurality of coffered ceiling modules wherein each ceiling module is adapted to be selectively removably fitted with a lighting fixture whereby the lighting arrangement in said ceiling structure may be varied to provide

lighting in some such modules, and no lighting in other such modules, each said module comprising;

upwardly directed side walls, and a horizontal top wall, formed of sound attenuating material, and forming a hollow box-like structure having a downwardly directed open side;

suspension means on each of said modules whereby each said module is independently suspended from above;

ceiling panel support means extending outwardly along the lower edges of said box-like structure whereby ceiling panels are supported between adjacent modules;



unobstructed opening means in said top wall of predetermined length and width communicating with said ceiling void for removably receiving a said lighting fixture therein from below,

and said ceiling structure further comprising lighting fixtures of predetermined length and width, dimensioned to fit within said opening means and be removably installed in at least some said opening means from below, any other of said opening means being closed by removable panel means whereby those modules without lighting fixtures will present a finished appearance.

4,175,361
OPENABLE CANOPY HOUSING
Masami Kumode, Tokyo, Japan, assignor to Kiyomitsu Tanaka, Nagoya, Japan, a part interest
Filed Oct. 13, 1977, Ser. No. 841,838
Int. Cl.[2] L04B *1/346*
U.S. Cl. 52—66 **11 Claims**

1. An openable canopy housing comprising:

a base for said housing;

a horizontal beam mounted a predetermined distance above said base of said housing;

said horizontal beam having a major longitudinal axis;

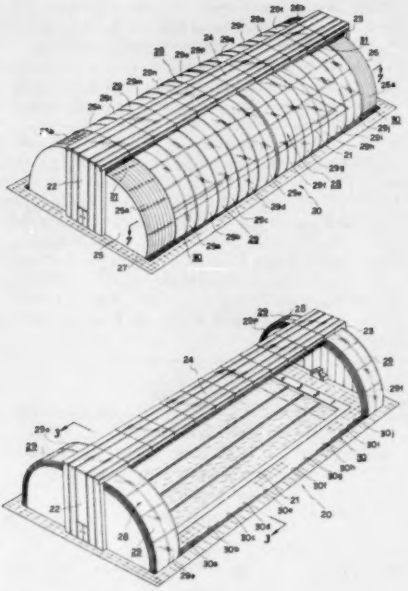
a plurality of transparent arched panels arranged on both sides of said horizontal beam;

said plurality of transparent arched panels being extended at their lower ends to said base of said housing;

said plurality of transparent arched panels being movable parallel to said major longitudinal axis of said horizontal beam of said housing;

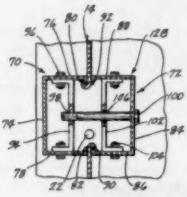
said transparent arched panels being arranged in the direction of said major longitudinal axis of said horizontal beam; and

said transparent arched panels having radii of curvature varying in accordance with the order of arrangement of said transparent arched panels so that when said panels are



moved in the direction of said major longitudinal axis of said horizontal beam, said panels will overlap each other.

4,175,362
WALL STRUCTURE
Charles V. Frederick, Rte. #5, New Virginia, Iowa 50210
Filed Feb. 21, 1978, Ser. No. 879,064
Int. Cl.[2] E04B *1/00*
U.S. Cl. 52—274 **7 Claims**



1. A building structure comprising,

a supporting surface,

a plurality of vertically disposed and horizontally spaced-apart columns secured at their lower ends to said supporting surface and extending upwardly therefrom,

at least one vertically disposed panel member positioned between each pair of adjacent columns, each of said panel members having opposite side edge portions,

each of said columns being comprised of a plurality of column members secured together to form the said column,

each column having complementary flanges provided thereon which extend therefrom into the interior of said column,

the side edge portions of said panel members having generally U-shaped channels which are received between a pair

of adjacent flanges of adjacent column members of a column,

bolt means securing together the column members of each of said columns, and

one of said flanges on each of said column members being received in a single U-shaped channel of separate panel members, whereby said panel members are secured against horizontal movement outwardly of said columns.

4,175,363

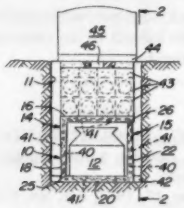
FOOTERS FOR SUPPORTING MONUMENTS FOR CEMETERIES AND THE LIKE

Benson Moskowitz, 221 Edgehill Dr., Havertown, Pa. 19083

Filed Dec. 14, 1977, Ser. No. 860,297

Int. Cl.² E02D *27/00*

U.S. Cl. 52—294 **20 Claims**



1. A stable, multi-component footer for supporting monuments for cemeteries and the like, said footer forming a hollow, generally rectangular structure for installation within a grave containing a casket and having capacity for ease of assembly, said footer including

(a) a pair of horizontally spaced, vertical side members, said side members each being integral and being spaced apart sufficiently to accommodate a casket therebetween,

(b) said side members each having upper end portions and lower end portions, said upper end portions terminating at locations adjacent the upper surface of a casket deposited in the grave and said lower end portions terminating adjacent the bottom of the grave,

(c) a horizontal support member extending between the two side members and connected to the spaced upper ends of said side members, said horizontal support member being located proximate the upper surface of the casket,

(d) said horizontal support member and one of the vertical side members comprising an integral L-shaped member, said horizontal support member having a proximal end joined integrally to the upper end portion of its said integral side member, and

(e) locking means detachably securing the upper end of the second side member to the horizontal support member,

(f) said locking means comprising engageable complementary male and female elements adapted to provide stability to the footer when the members thereof are assembled.

4,175,364

CASE PACKER HEAD

Michael L. Becker, Akron, and William G. Wilfong, Mogadore, both of Ohio, assignors to A-T-O Inc., Willoughby, Ohio

Filed Mar. 27, 1978, Ser. No. 890,496

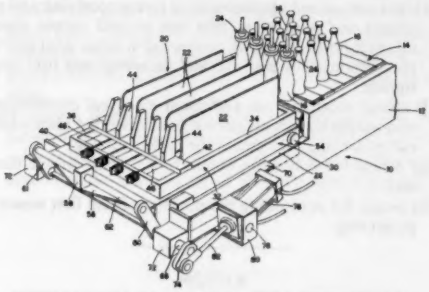
Int. Cl.² B65B *21/16*

U.S. Cl. 53—539 **11 Claims**

5. In an article packing apparatus having a frame, a case packer head including a grid frame means for receiving a plurality of rows of abutted articles therein, an upstream end of said grid frame means being supported on said packing apparatus frame, a skid blade frame carried by said grid frame for support of articles moved into said grid frame means but movable laterally in relation to said grid frame for article release, the improvement characterized by

support means for said grid frame means including a pivotal control arm engaging the downstream end of said grid frame means to support the same, and

control members engaging said control arm to pivot the



same and move said downstream end of said grid frame means vertically to incline said grid frame means downwardly for article loading action and to position said grid frame means horizontally for article release.

4,175,365

METHOD AND APPARATUS FOR MEASURING DISTANCES

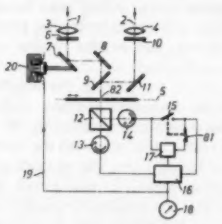
Ludwig Leitz; Knut Heitmann; Eckart Schneider, all of Wetzlar, and Horst Schmidt, Nauborn, all of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Continuation of Ser. No. 480,825, Jun. 19, 1974, abandoned, which is a continuation of Ser. No. 309,809, Nov. 27, 1972, abandoned. This application Feb. 26, 1976, Ser. No. 661,761

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1971, 2158761

Int. Cl.² G01C *3/08*

U.S. Cl. 356—4 **6 Claims**



1. In an apparatus having an extended object of a plurality of discrete structures reproduced by a first objective having a first line of sight and a second objective having a second line of sight for the evaluation of stereoscopic images by the determination of the maximum degree of correlation of a first image reproduced by said first objective and a second image identical with the first reproduced by said second objective, the improvement comprising:

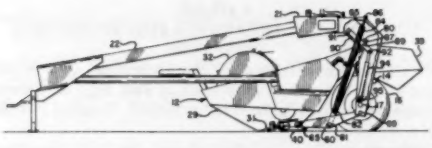
(a) a first filter (6) positioned in the first line of sight and a second filter (10) positioned in the second line of sight to filter said images for physical characterization;

(b) a first and second means for projecting unidirectionally the filtered images into a plane (5) along an image axis;

(c) means provided with at least one specific spatial frequency component and located in said plane along said image axis, said means being adapted for comparing areal structures composed of a plurality of points in said images by optical correlation and generating from said compari-

son optically discernible signals indicative of the position of said object;
(d) a beam splitter located along said image axis projecting said first image in a first direction and said second image in a direction at an angle of 90° to said first direction;
(e) first and second photoelectrical means receiving said split images and generating first and second output signals, means for differentiating connected in series with said first photoelectrical means and and receiving said first output signals;
(f) circuit means for an additional electrical correlation of said output signals connected to said second photoelectrical means and said means for differentiating;
(g) means for indicating connecting to said circuit means; and
(h) means for controlling the position of said first means for projecting.

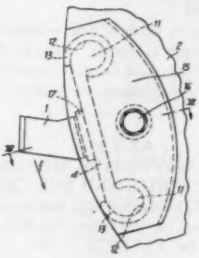
4,175,366
HARVESTER LIFT AND FLOAT MECHANISM
George B. Cicci, Burr Ridge, Ill., assignor to International Harvester Company, Chicago, Ill.
Filed Jun. 12, 1978, Ser. No. 914,320
Int. Cl.[2] A01D *47/00*
U.S. Cl. 56—15.8 **5 Claims**



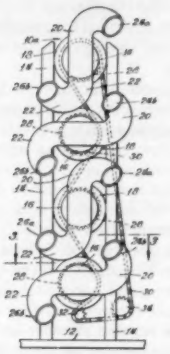
1. A mobile crop harvester comprising: a wheel supported main frame including a pair of generally vertical laterally disposed frame members and a horizontal beam extending laterally between said vertical members;
an elongated crop harvesting header mounted to said frame by a pivotal linkage including an upper link and a pair of laterally disposed lower swing links for movements of the header between a lowered operating position and a raised transport position, said header further comprising a cutting apparatus disposed across the forward edge thereof and ground shoes for gaging the height of said cutting apparatus in the operating position; and
floatation spring means interconnecting the upper portion of said vertical frame members with the intermediate portion of said lower swing links, the pivotal connection of said floatation spring means to said lower swing links being below a line interconnecting the pivotal mountings of said lower links to said frame and to said header and being below the pivotal mounting of said lower link to said frame in the operating position.

4,175,367
DEVICE FOR FIXING THE KNIVES OF ROTARY MOWERS
Jacques E. Bouet, Villeneuve d'Ascq, France, assignor to International Harvester Company, Chicago, Ill.
Filed Dec. 19, 1977, Ser. No. 861,738
Claims priority, application France, Dec. 30, 1976, 76 39557
Int. Cl.[2] A01D *55/18*
U.S. Cl. 56—295 **2 Claims**

1. In a rotary mower, a rotary cutting unit comprising a cutting element mounted on said mower for rotation in a generally horizontal plane, a plurality of separate elongated elastomeric members, each having both of its ends attached to said cutting element at circumferentially spaced locations thereon, each of the ends of said elastomeric member comprises a bulge and the cutting element has a housing in which the bulge is imprisoned, and a plurality of cutting knives corresponding to said elastomeric members, each knife being attached to the central portion of its respective elastomeric member in a manner permitting the knife to move substantially radially relative to said cutting element subject to the centrifugal forces acting on said elastomeric member.



4,175,368
HARVESTING APPARATUS AND PROCESS
Edward D. Scheffler, Coloma, Mich., assignor to Ag Superior, Inc., Riverside, Mich.
Filed Aug. 15, 1977, Ser. No. 824,815
Int. Cl.[2] A01D *46/00*
U.S. Cl. 56—328 R **30 Claims**



1. Apparatus for harvesting fruit from trees which comprises air blast-producing means for directing a blast of air into said tree from the circumference of a circle which lies in a substantially vertical plane apposed to the foliage expanse of said tree, and moving means for causing said blast of air to move about the said circumference as a rotating unit which rotates about the center of said circle, in which said air blast-producing means comprises a plurality of nozzles spaced along said circumference and oriented to direct a blast of air into the foliage of said tree, and said moving means comprises means for shifting said blast of air from one nozzle to the next adjacent nozzle in succession.

4,175,369
HAYMAKING MACHINE WITH LATERAL DISCHARGE WINDROWING AND CENTRAL TEDDING
Frédéric Gerlinger, Ottersthal, France, assignor to Kuhn S.A., Saverne, France
Filed Nov. 4, 1977, Ser. No. 848,593
Claims priority, application France, Nov. 5, 1976, 76 34063
Int. Cl.[2] A01D *79/00*
U.S. Cl. 56—370 **5 Claims**

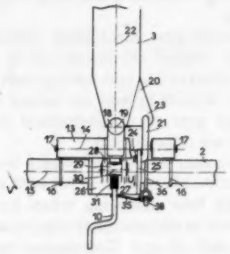
1. A combined haymaking machine, permitting of carrying

out lateral discharge windrowing work and central tedding work, said machine comprising:

at least two rotary rake heads interconnected by a chassis,

a control member the actuation of which causes the chassis of the machine to rotate about a first axis parallel with the longitudinal axis of the said chassis,

an intermediate element articulated to the chassis about said first axis, and



a beam extending between said chassis and a hitch device, said beam being articulated in relation to the intermediate element about a second substantially vertical axis while being connected to the said chassis by a connecting rod which is eccentric in relation to the longitudinal axis of the said beam and is articulated about a substantially vertical axis and about a substantially horizontal axis.

4,175,370

PIECING APPARATUS FOR AN OPEN-END SPINNING MACHINE

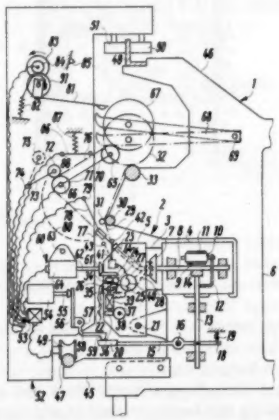
Fritz Stahlecker, Bad Überkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker and Fritz Stahlecker, both of, Fed. Rep. of Germany

Filed Jun. 5, 1978, Ser. No. 912,418

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1977, 2728003

Int. Cl.[2] **D01H** *15/00*

U.S. Cl. 57—263 **21 Claims**



1. A piecing device for an open-end spinning machine of the type having a plurality of spinning assemblies which each include a rotatable storage spool for storing yarn as it is spun at said spinning assembly, spool drive means for driving said spool during spinning operations, and yarn guide means for guiding the yarn between the rotor of the spinning assembly and the spool during spinning operations; said piecing device comprising:

auxiliary spool drive means for driving the spool at a spinning assembly during piecing operations at said spinning assembly,

auxiliary yarn guide means for guiding the yarn between the spool and a yarn outlet of a spinning rotor of the spinning assembly during piecing operations, said auxiliary yarn guide means including auxiliary driven feed means for said yarn,

and control means for controlling the course of the yarn between the auxiliary driven feed means and the spool so as to reduce formation of a loop in the yarn during acceleration of the drawing off of the yarn during piecing.

4,175,371

BROKEN END-COLLECTING INSTALLATION AND METHOD OF OPERATING THE SAME

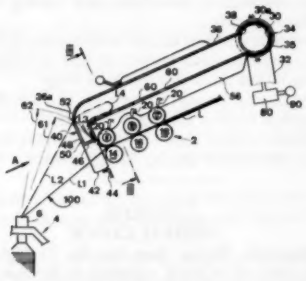
Hermann Gasser, Zürich, and Karl Cüriger, Pfaffikon, both of Switzerland, assignors to Luwa AG, Zurich, Switzerland

Filed Mar. 21, 1978, Ser. No. 888,754

Claims priority, application Switzerland, Mar. 28, 1977, 3864/77

Int. Cl.[2] **D01H** *5/68, 11/00*

U.S. Cl. 57—304 **20 Claims**



1. A broken-end collecting installation for the drafting gears of spinning machines, each defining gear having cooperating upper and lower rollers, including at least one pair of feed rollers defining a spinning triangle, through which fiber material passes on to guide means of a twisting head comprising:

a suction head provided for each drafting gear;

means defining an air pressure sink operatively connected with said suction head;

said suction head incorporating a substantially slot-shaped suction opening operatively associated with the feed rollers of the related drafting gear;

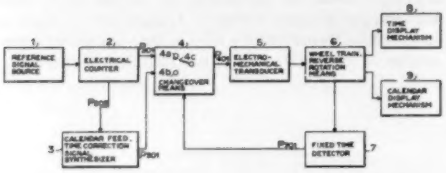
said slot-shaped suction opening extending from a first end thereof situated closer to the spinning triangle to a second end thereof situated closer to the air pressure sink in the flow direction of the air;

said slot-shaped suction opening also extending in a direction with respect to said flow direction whereby said second end is transversely spaced from said first end, whereby upon rupture of the fiber material at a location subsequent to the guide means the fiber material extending to the guide means is induced to be sucked towards said second end and further delivered fiber material passes into the suction opening adjacent said first end.

4,175,372
ELECTRONIC TIMEPIECE

Munetaka Tamaru, Tokyo; Kazunari Kume; Minoru Watanabe, both of Tokorozawa; Hideshi Ohno, Sayama, and Minoru Natori, Nishitama, all of Japan, assignors to Citizen Watch Co. Ltd., Tokyo, Japan

Filed Mar. 16, 1977, Ser. No. 778,159
Claims priority, application Japan, Mar. 16, 1976, 51-28253
Int. Cl.[2] G04B *19/24, 27/00;* **G04C** *21/32*
U.S. Cl. 58—5 **14 Claims**

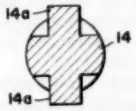


1. An electronic timepiece comprising:
(a) a reference signal source;
(b) an electronic counter connected to said reference signal source and having first and second outputs;
(c) a changeover means having a first input connected to the first output of said electric counter and a second input and an output;
(d) a calendar feed and time correction signal synthesizer connected between the second output of said electrical counter and the second input of said changeover means;
(e) an electro-mechanical transducer connected to the output of said changeover means;
(f) mechanical display driving means connected to said electro-mechanical transducer and having first, second and third outputs;
(g) a fixed time detector connected between said changeover means and the third output of said mechanical display driving means to form a feedback loop;
(h) a time display means connected to the first output of said mechanical display driving means; and
(i) a calendar display means connected to the second output of said mechanical display driving means.

4,175,373
DIGITAL CLOCK

Kazuo Miyamoto, Showa; Isao Suzuki, Tochigi, and Hideo Koide, Urawa, all of Japan, assignors to Rhythm Watch Company Limited, Tokyo, Japan

Filed Dec. 30, 1977, Ser. No. 865,937
Claims priority, application Japan, Aug. 16, 1977, 52/98503
Int. Cl.[2] G04B *23/00;* **G04C** *21/16;* **G04B** *19/02*
U.S. Cl. 58—16 D **10 Claims**

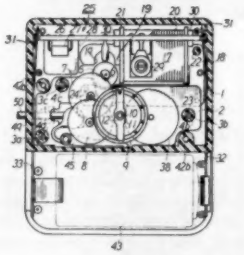


1. A digital display clock comprising:
a driving section including a means for generating time signals which produce rotating driving power;
an indicating display including a one-minute indicating wheel, a ten-minute indicating wheel, and an hour indicating wheel which receive rotation driving power from said driving section and which are mounted on an indicating wheel shaft to be driven intermittently, said one-minute indicating wheel, said ten-minute indicating wheel and said hour indicating wheel being mounted on an indicating wheel shaft;
a (frist) first Geneva-gear mechanism which transmits the rotation driving power through said driving section for an intermittent driving power at intervals of one minute to said indicating wheel shaft, and, one-minute indicating wheel rotating with said indicating wheel shaft;
a driving shaft (separately secured from) laterally mounted with respect to said indicating wheel shaft, a single gear on said driving shaft, (and simultaneously rotated with) said ten-minute indicating wheel being freely rotatable on said indicating wheel shaft and being engaged by said gear for rotation;
a second Geneva-gear mechanism (which transmits the intermittent rotation of) connected to said one-minute indicating wheel and to said driving shaft (and) to transmit intermittent motion to said ten-minute indicating wheel through said gear as an intermittent driving power at intervals of ten minutes; and
a third Geneva-gear mechanism (which transmits the intermittent rotation of) connected between said driving shaft (to) and said hour indicating wheel for an intermittent driving power to said hour indicating wheel at intervals of one hour, each of said Geneva-gear mechanisms being positioned at the ends of said driving shaft and only said single gear being positioned intermediate the ends of said indicating display so that said indicating display is substantially uninterrupted by lateral spacing.

4,175,374
TIMEPIECE

Keiichi Yoshizawa, Tokyo, Japan, assignor to Kabushiki Kaisha Seikosha, Japan

Filed Jul. 22, 1977, Ser. No. 818,324
Claims priority, application Japan, Jul. 23, 1976, 51-87873
Int. Cl.[2] G04B *13/02;* **G04C** *3/00*
U.S. Cl. 58—23 R **8 Claims**

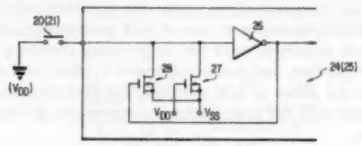


1. A timepiece comprising:
an upper case;
a middle plate connected to said upper case with a predetermined space therebetween;
a lower case removably connected with said upper case and spaced from said middle plate;
hands for indicating time;
a movement comprising a motor block and a circuit block for actuating said hands, secured to and supported by said upper case and said middle plate;
and means comprising a gear train for transmitting rotation from said motor block to said hands, said gear train being supported between said upper case and said middle plate independently of said lower case;
whereby said movement is operable with said lower case removed.

4,175,375
ELECTRONIC WATCH HAVING IMPROVED LEVEL SETTING CIRCUIT

Tsuneo Takase, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kanagawa, Japan

Filed Oct. 26, 1977, Ser. No. 845,549
Claims priority, application Japan, Dec. 15, 1976, 51/150456
Int. Cl.[2] G04B *19/24;* G04C *3/00;* G04B *19/30, 27/00*
U.S. Cl. 58—23 R 4 Claims

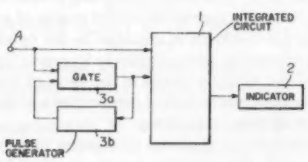


1. An electronic watch comprising:
(a) a switch input means,
(b) level setting means connected to the switch input means and consisting of a switching element with an input electrode, and resistive means, respectively connected between the switch input means and a power source, and an inverter circuit whose input portion is connected to the switch input means and whose output portion is connected to the input electrode of the switching element,
(c) a control circuit connected to the level setting means,
(d) a time computer connected to the control circuit for producing a standard clock pulse, and
(e) display means connected to receive the output of the time computer for displaying time, said display means being connected to the control circuit, wherein the switching element is arranged closer to the switch input means than the resistive means.

4,175,376
DEVICE FOR CORRECTING TIME INDICATION AND THE LIKE IN AN ELECTRONIC CLOCK

Sukehiro Hasebe, and Masanao Oyamada, both of Tokyo, Japan, assignors to Copal Company Limited, Tokyo, Japan

Filed Sep. 2, 1977, Ser. No. 830,144
Claims priority, application Japan, Sep. 10, 1976, 51-108635
Int. Cl.[2] G04C *3/00;* G04B *27/08*
U.S. Cl. 58—23 R 7 Claims

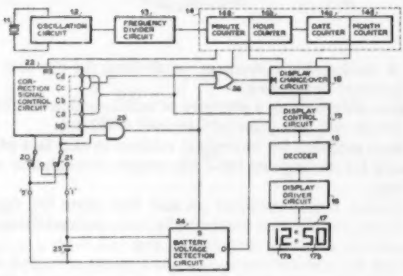


1. Device for correcting time indication in an electronic clock having a clock circuit in which reference clock pulses are frequency divided so as to be applied to a time indicating device for stepwise switching the time indication therein one by one unit of time for indicating the time, and the time indication is corrected stepwise one by one unit of time in timed relationship to said reference clock pulses by applying time correction pulses to said clock circuit until the correction of time is achieved, wherein the improvement comprises a gate circuit for opening and closing the application of said reference clock pulses to said clock circuit and a control circuit for applying pulses of variable frequency to said gate circuit so as to control the same to be opened and closed, said reference clock pulses being applied through said gate circuit to said clock circuit during the time said gate circuit is opened thereby permitting the speed of stepwise correction of time to be adjusted arbitrarily in timed relationship to said reference clock pulses.

4,175,377
TIMEPIECE WITH DISPLAY DEVICE FOR WARNING BATTERY LIFE

Singo Ichikawa, Sayama, Japan, assignor to Citizen Watch Co. Ltd., Tokyo, Japan

Filed Nov. 4, 1977, Ser. No. 848,666
Claims priority, application Japan, Nov. 5, 1976, 51-132988
Int. Cl.[2] G04C *17/00*
U.S. Cl. 58—23 BA 8 Claims

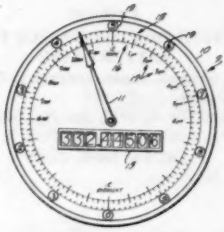


1. In a timepiece provided with a display device for warning a battery life, comprising:
(a) time reference signal generation means for generating a time reference signal;
(b) time counting unit signal preparing means for preparing a time counting unit signal from the time reference signal delivered from said time reference signal generation means;
(c) time counter means for counting the time counting unit delivered from said time counting unit signal preparing means;
(d) display driving means for receiving a signal delivered from said counter means and delivering a display driving signal;
(e) liquid crystal display means for effecting a digital display of the display driving signal delivered from said display driving means; and
(f) an electric supply source battery for supplying energy to said respective means,
the improvement comprising:
(g) a display change-over control means connected between said time counter means and said display driving means and changing over for controlling the display;
(h) exteriorly operable switch means for controlling functions of the electronic timepiece;
(i) a battery voltage detection means provided with a sampling terminal and an output terminal and detecting a voltage level of said electric supply source battery by means of a sampling pulse supplied to said sampling terminal and generating a warning signal at said output terminal when said voltage level of said electric supply source battery becomes lower than a preset value;
(j) correction signal control means for selecting either an ordinary display mode or a display correcting mode under the control of said exteriorly operable switch means; and
(k) gate means for inhibiting the operation of said battery voltage detection circuit when said correction signal control circuit is in the display correcting mode.

4,175,378
DECIMAL TIMEKEEPING INSTRUMENT

Vernon E. Shelton, 775 Battery St., Manhattan Beach, Calif. 90731

Continuation-in-part of Ser. No. 443,728, Feb. 19, 1974, abandoned. This application Aug. 12, 1975, Ser. No. 603,795
Int. Cl.[2] G01D *9/00*; G04B *19/24*
U.S. Cl. 346—20 2 Claims

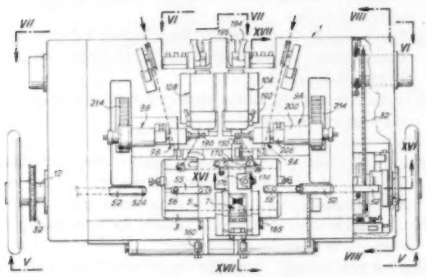


1. A timekeeping instrument for dividing the day into decimal divisions comprising:
- a face plate bearing a plurality of indicia which function to divide said face plate into decimal divisions;
- a hand mounted for movement relative to said face plate;
- means for driving said hand one complete revolution in one day;
- a display means mounted on said face plate for digitally displaying thereon the time of day in decimal divisions;
- means for receiving card means; and
- means for transferring to said card means a record of the display on said display means when said card means is received.

4,175,379
MACHINE FOR MAKING DECORATIVE CHAINS HAVING LINKS OF AT LEAST TWO DIFFERENT SHAPES OR SIZES

Ezio Tega, 2, Via Carpaccio, Arezzo, Italy (I-52100)

Filed Feb. 13, 1978, Ser. No. 877,559
Claims priority, application Italy, Feb. 11, 1977, 9335 A/77; Jul. 29, 1977, 9529 A/77; Jul. 29, 1977, 9530 A/77
Int. Cl.[2] B21L *11/00*
U.S. Cl. 59—16 17 Claims

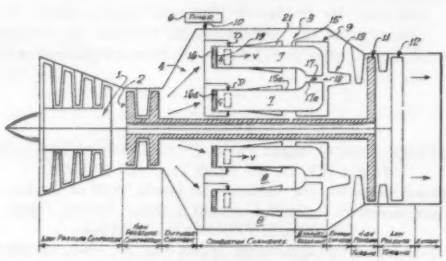


1. In a machine for forming decorative chains having links of two shapes and/or sizes, obtainable according to a modifiable program, involving two feeder units for feeding independent supplies of wire-like material, and a pliers unit adapted to cooperate alternatively with one or the other of said feeder units, the improvement in which each feeder unit includes its own associated counter-pliers system and in which a pliers unit is reciprocably movable between two spaced positions of independent cooperation with one or the other of the respective counter-pliers systems, double-acting actuating means for imparting to said pliers unit a reciprocable displacement into a selected one or the other of said positions, a main camshaft and means for continuously driving the same, first selectively operable means for operatively connecting said camshaft to said actuating means to displace said pliers unit to one of said positions, second selectively operable means for operatively connecting said camshaft to said actuating means to displace said pliers unit to the other of said positions, each counter-pliers system including its own camshaft for counter-pliers actuation, a separate drive connection from said main camshaft to each of said counter-pliers camshafts, each said drive connection including an independently actuable clutch, means responsive to plier-unit displacement to one of said positions for actuating the clutch associated with the cooperating counter-pliers for said one position, and means responsive to pliers-unit displacement to the other of said positions for actuating the clutch associated with the cooperating counter-pliers for said other position.

4,175,380
LOW NOISE GAS TURBINE

Orestes M. Baycura, 2238 Central Park Dr., Campbell, Calif. 95008

Filed Mar. 24, 1978, Ser. No. 889,704
Int. Cl.[2] F02C *5/00*
U.S. Cl. 60—39.06 10 Claims



1. A method for effectively cancelling pressure pulse noise from the exhaust of a turbine-driven jet engine of a type having an elongate gas combustion chamber in the opposite ends of which fuel alternately and repetitively is ignited for generating combustion gas pressure pulses in the form of a sinusoidally-pulsating standing wave having pressure anti-nodes and velocity nodes at its ends, comprising:
- setting the frequency of said alternating ignitions in accordance with the chamber length to provide a standing wave having an even multiple of quarter wave lengths with a pressure node and velocity anti-node at its midway point,
- discharging said combustion gases into a storage reservoir at said midway point,
- storing said discharged gases in said reservoir, and
- delivering said stored gases to said turbine to produce its drive,
- said discharge of said gases at said midway pressure node point effectively cancelling the high pressure of combustion from said stored gases so as to effectively cancel pressure pulse noise from said jet engine exhaust, and said storage of high velocity gases derived from said velocity anti-node discharge smoothing the pulsating characteristics of said gases sufficiently to permit delivery to said turbine at a relatively fixed velocity rate.

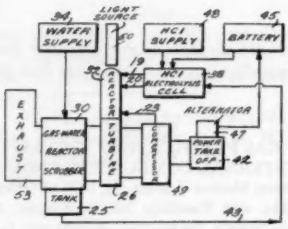
4,175,381
ELECTROMAGNETIC REACTOR ENGINE SYSTEM-APPARATUS AND METHOD

Robert L. Scragg, and Alfred B. Parker, both of Miami, Fla., assignors to Solar Reactor Corporation, Miami, Fla.

Continuation-in-part of Ser. No. 692,495, Jun. 3, 1976, Pat. No. 4,070,861, which is a continuation-in-part of Ser. No. 657,383, Feb. 10, 1976, Pat. No. 4,026,112, which is a continuation-in-part of Ser. No. 588,888, Jun. 20, 1975, Pat. No. 4,024,715, which is a continuation-in-part of Ser. No. 564,087, Apr. 1, 1975, Pat. No. 3,998,205. This application Dec. 6, 1977, Ser. No. 857,895

Int. Cl.[2] F02B *43/00*

U.S. Cl. 60—39.12 **20 Claims**



1. An electromagnetic engine system comprising:
an electromagnetic reactor;
a hydrochloric acid electrolysis cell;
means for generating chlorine and hydrogen in said hydrochloric acid cell;
means for controllably coupling said chlorine and hydrogen to said reactor;
means for controllably coupling oxygen to said reactor;
means for directing electromagnetic radiation into said reactor to thereby exothermically react said hydrogen and chlorine in the presence of said oxygen to generate hydrogen chloride at a high pressure and temperature level;
a turbine attached to said reactor to enable said generated hydrogen chloride to drive the rotor of said turbine;
a gas-water reactor scrubber attached to said turbine to receive the spent hydrogen chloride from said turbine;
means for converting said spent hydrogen chloride to hydrochloric acid; and
means for conveying said hydrochloric acid to said hydrochloric acid cell.

4,175,382
STEAM POWER PLANT WITH PRESSURE-FIRED BOILER

Hans Pfenninger, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

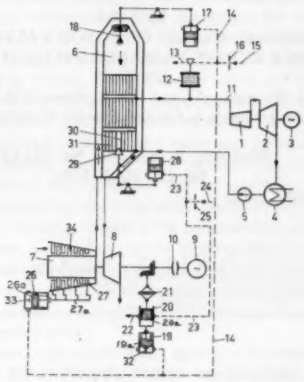
Continuation of Ser. No. 704,040, Jul. 9, 1976, abandoned. This application Feb. 24, 1978, Ser. No. 880,992

Claims priority, application Switzerland, Aug. 22, 1975, 10896/75

Int. Cl.[2] F02C *9/04, 9/14*

U.S. Cl. 60—39.18 B **4 Claims**

1. Apparatus for regulating a steam power plant of the type including a pressure-fired boiler supplying steam to a turbine group, a charging group for the boiler operating at high pressure ratios, said charging group including an axial flow compressor having adjustable blading and which is driven by a gas turbine for supplying combustion air to the boiler and a speed governor, said gas turbine being driven by combustion gas discharged from the boiler such that the heat content thereof is substantially completely consumed in the turbine and the power delivered by it to the compressor, and a governor in the live steam feed line from the boiler to the steam turbine group, said regulating apparatus comprising first means responsive to a variable control signal produced by said live-steam governor in accordance with a variation in plant load for regulating fuel flow to said boiler, second means responsive to said control signal for regulating the heat content of the combustion gas flowing to said gas turbine and for regulating said speed governor, third means responsive to said control signal for adjusting the compressor blading, and means effecting a sequentially functional relationship between said second and third means such that in the case of a decrease in plant load and a resultant increase in live steam pressure, first the speed of said charging group is decreased to and held at a predetermined value by a reduction in the heat content of the combustion gas flowing to



said gas turbine followed by an adjustment of the compressor blading in a direction to reduce its air throughput with the speed of said charging group being held constant at said decreased predetermined value, whereas in the case of an increase in plant load and a resultant decrease in live-steam pressure, first said compressor blading is adjusted in a direction to increase its air throughput followed by an increase in the heat content of the combustion gas flowing to said gas turbine and hence an increase in speed of said charging group.

4,175,383
GAS TURBINE ENGINE FUEL CONTROL SYSTEM

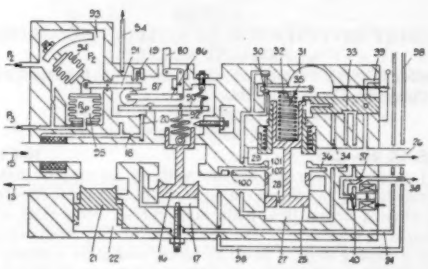
Trevor S. Smith, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Nov. 17, 1977, Ser. No. 852,313

Claims priority, application United Kingdom, Jan. 7, 1977, 655/77

Int. Cl.[2] F02C *9/04*

U.S. Cl. 60—39.28 R **7 Claims**



1. A fuel control system for a gas turbine engine, comprising a variable metering device, a throttle valve, a flow passage connecting said metering device and said throttle valve in a series arrangement between an inlet zone and an outlet zone, means for varying the fuel pressure at said inlet zone, said pressure varying means being responsive to a difference between the fuel pressure at one of said zones and to a further fuel

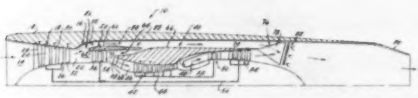
pressure, and selector valve means, operable by said throttle valve, for deriving said further pressure from that in said connecting flow passage when said throttle valve is fully open, and from the pressure at the other of said zones in all other states of said throttle valve, whereby said pressure varying means is responsive to the pressure difference across said metering device when the throttle valve is fully opened and to the pressure difference across said series arrangement in all other states of said throttle valve.

4,175,384

INDIVIDUAL BYPASS INJECTOR VALVES FOR A DOUBLE BYPASS VARIABLE CYCLE TURBOFAN ENGINE

Conrad D. Wagenknecht, and Guy K. Faust, both of West Chester, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Aug. 2, 1977, Ser. No. 821,119
Int. Cl.[2] F02K *3/04*
U.S. Cl. 60—226 B **8 Claims**



5. An improved gas turbofan engine of the type having a core engine, a front fan section for pressurizing a flow of air, an outer bypass duct for bypassing a stream of pressurized air around the core engine, an aft fan section for further pressurizing the air discharged from the front fan section and an inner bypass duct for bypassing an airstream from the aft fan section into the outer bypass duct and around the core engine, wherein the improvement comprises:

a common bypass duct for receiving confluent streams from the inner and outer bypass ducts and bypassing the confluent flow around the core engine; and

a variable area bypass injector for selectively modulating and separating the airstreams through the inner and outer bypass ducts including static pressure valve means for varying the area through which the inner bypass duct airstream is injected into the common bypass duct at the point of confluence of the inner and outer bypass ducts, and a bypass selector valve associated with the outer bypass duct and which is operable between two positions, one at which flow through the outer bypass duct is prohibited and another at which flow through the outer bypass duct is permitted.

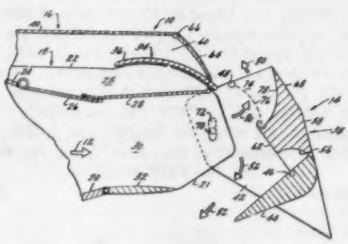
4,175,385

THRUST REVERSER FOR AN ASYMMETRIC AIRCRAFT EXHAUST NOZZLE

Dudley O. Nash, Forest Park, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Dec. 12, 1977, Ser. No. 859,515
Int. Cl.[2] F02K *1/20, 1/24*
U.S. Cl. 60—230 **10 Claims**

1. A thrust reverser for use with an asymmetric exhaust nozzle having an exhaust casing partially defining to its interior an exhaust stream flow path, said reverser comprising a flap located downstream of the casing and having a leading edge and a trailing edge, a first flap pivot, means for rotating said flap about said first pivot such that the flap leading edge describes an arc intercepting the exhaust stream so that the flap leading edge is immersed in the exhaust stream and separated from the casing by a gap, a second flap pivot located along the arc at a point fixed in relation to said exhaust casing, means for rotating said flap about the leading edge at said second pivot, means associated with the flap leading edge for turing a portion of the exhaust stream upward through an angle greater than ninety degrees and through the gap when said flap is rotated about said first pivot, and means associated with the flap trailing edge for deflecting the remainder of the exhaust



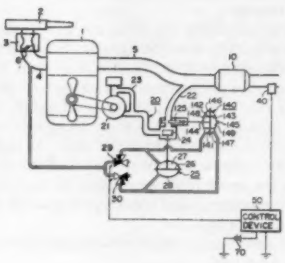
stream downward through an angle greater than ninety degrees when said flap is rotated about said first pivot.

4,175,386

EXHAUST GAS PURIFICATION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Eturou Katahira; Shunzo Yamaguchi, both of Okazaki; Masashi Kida, Nishio, and Yasuhiko Ishida, Susono, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Feb. 25, 1977, Ser. No. 772,277
Claims priority, application Japan, Mar. 8, 1976, 51-24907; Apr. 13, 1976, 51-42146; Apr. 14, 1976, 51-42695
Int. Cl.[2] F01N *3/10*
U.S. Cl. 60—276 **7 Claims**



1. An exhaust gas purification apparatus for an internal combustion engine comprising:

exhaust gas reactor means disposed at an intermediate portion of an exhaust pipe of an engine, for purifying exhaust gases in said exhaust pipe;

secondary air supply means having an air supply path for supplying secondary air to the exhaust gases, one end of said air supply path being opened in said exhaust pipe on the upstream side of said reactor means;

air-fuel ratio sensor means mounted in said exhaust pipe on the downstream side of said one end of said air supply path for sensing the air-fuel ratio of the exhaust gases to produce an output signal;

a control device electrically connected to said air-fuel ratio sensor means, for producing an actuation signal in accordance with the output signal of said air-fuel ratio sensor; and

a first air flow control valve disposed in said air supply path for fully opening said air supply path in one condition and fully closing the same in the other condition in accordance with said actuation signal to produce pulsating air flow so that said exhaust gases in said exhaust pipe are supplied with said secondary air intermittently at a position upstream of said reactor means;

a second air flow control valve disposed in said air supply

path in series with said first air flow control valve to variably control the passage area thereof; and

an actuating means coupled to said second air flow control valve to actuate the same, said actuating means actuating said second control valve in accordance with the movement of said first control valve, the passage area of said air supply path being increased when the duration of opening of said first control valve is increased, and the passage area of said air supply path being decreased when the duration of closing of said first control valve is increased.

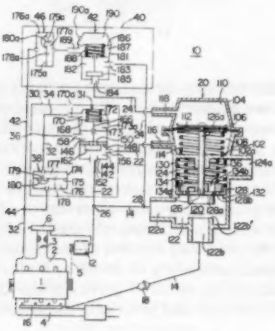
whereby the air-fuel ratio of the exahust gases to be entered into said reactor means is maintained substantially constant.

4,175,387

SECONDARY AIR SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Motohisa Miura, Toyota, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Jan. 24, 1978, Ser. No. 871,933
Claims priority, application Japan, Jan. 26, 1977, 52/7985
Int. Cl.[2] F01N *3/10*
U.S. Cl. 60—290 **2 Claims**



1. A secondary air supply system for an internal combustion engine, comprising:

an air pump adapted to be driven by an engine;

a secondary air supply line extending between said air pump and the engine exhaust system;

valve means in said secondary air supply line for controlling the secondary air supply from said air pump into said engine exhaust system;

a valve actuator operatively associated with said valve means and comprising first and second air pressure chambers, a diaphragm between said air pressure chambers, a first spring member disposed in said first air pressure chamber to yieldably act on said diaphragm and restricted passage means intercommunicating said first and second air pressure chambers;

a first control pressure line through which the air pressure produced by said air pump is supplied into said first air pressure chamber;

first controlling means in said first control pressure line for controlling the air pressure supply to said first air pressure chamber;

a second control pressure line through which the air pressure produced by said air pump is supplied into said second air pressure chamber; and

second controlling means in said second control pressure line for controlling the air pressure supply to said second air pressure chamber;

said valve means including a valve housing defining therein a space provided with air inlet and outlet ports connected to said air pump and said engine exhaust system, respectively, and an air release port;

said valve means further including a valve seat member disposed in said space between said air inlet and release ports for movement, the outer periphery of said valve seat member being in sealing and slidable engagement with the inner peripheral surface of said space, said valve seat member defining a main air release opening and at least one auxiliary air release opening all adapted to be communicated with said air release port;

said valve means further including a first valve member disposed in said space between said air outlet port and said main air release opening in said valve seat member and operatively connected to said diaphragm for movement thereby to control the communication between said air inlet and outlet ports and between said air inlet port and said main air release opening in said valve seat member, a stop means for limiting the movement of said valve seat member toward said first valve member, a second spring member yieldably urging said valve seat member against said stop means, a second valve member disposed in said space between said valve seat member and said air release port to control the communication between said auxiliary air release opening in said valve seat member and said air release port, and a third spring member yieldably urging said second valve member against said valve seat member to cause said second valve member to interrupt the communication between said auxiliary air release opening and said air release port;

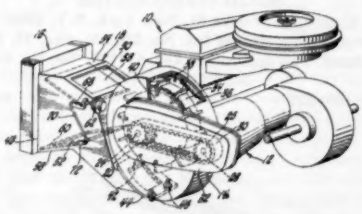
said first controlling means being operative to supply the air pressure into said first air pressure chamber at least at the initial stage of an engine acceleration operation while said second controlling means is operative to interrupt the supply of the air pressure into said second air pressure chamber at least at the initial stage of the engine acceleration operation whereby said valve actuator moves said first valve member together with said valve seat member and said second valve member away from said air outlet port against said second and third spring members.

4,175,388

RADIATOR COOLING SYSTEM

Herman C. Milbreath, Washington, and Alverson B. Williams, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 17, 1978, Ser. No. 887,489
Int. Cl.[2] F16D *33/00*
U.S. Cl. 60—337 **6 Claims**



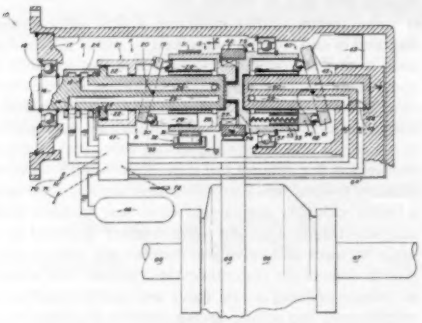
1. A cooling system for use with an engine and a transmission having a casing operatively connected therebetween, said casing having a torque converter housing rotatably mounted therein so as to be rotated by said engine, and a radiator including a coolant, said cooling system comprising a plurality of circumferentially spaced cooling fan blades formed on the outer surface of said torque converter housing for rotation therewith, first and second opening means formed in a wall of said casing, and a shroud secured at one end thereof to said casing around one of said first and second opening means and operatively mounted at the other end thereof adjacent a face of said radiator for communicating air between said radiator and said cooling fan blades.

4,175,389

HYDROMECHANICAL TRANSMISSION

Samuel Shiber, P.O. Box 110, Vernon Hills, Ill. 60061

Filed Feb. 6, 1978, Ser. No. 875,731
Int. Cl.[2] F15B *1/02, 39/46*
U.S. Cl. 60—414 9 Claims



1. A hydrostatic transmission adapted for a plurality of operational modes, comprising in combinations:

a first pump having a first section serving as a mechanical input member of said transmission, a second section, and inlet port and an outlet port,

a second variable displacement pump (motor) having a first portion, serving as a mechanical output member of said transmission, coupled to said second section by clutch means, a second anchored portion, a suction port and a discharge port,

an accumulator for storing fluid under pressure, and

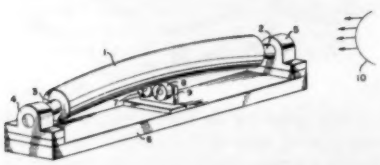
control means connected to said ports and said accumulator via conduits.

4,175,390

SOLID STRESS MOTOR

George Koslow, 28 Warren St., New York, N.Y. 10007

Continuation-in-part of Ser. No. 536,842, Dec. 27, 1974, abandoned. This application Apr. 6, 1978, Ser. No. 893,994
Int. Cl.[2] F03G *7/06*
U.S. Cl. 60—527 14 Claims



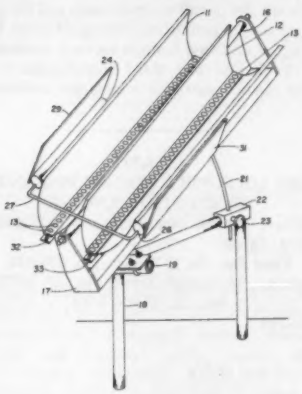
1. A solid stress motor comprising at least one rotor having a central portion of circular cross sectional shape, means for supporting said rotor for free rotation about an axis, and deflecting means engaging a circular central portion of said rotor for elastically deflecting said central portion of said rotor laterally of said axis and thereby rendering a portion of said rotor stress-responsive, whereby rotation of said rotor is induced by application of stress-change producing media to said stress-responsive portion of said rotor.

4,175,391

SELF REORIENTING SOLAR TRACKER

Stephen Baer, Corrales, N. Mex., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 12, 1977, Ser. No. 859,624
Int. Cl.[2] F03G *7/02, 7/06*
U.S. Cl. 60—531 4 Claims



1. In a solar tracking device comprising a pair of closed containers interconnected in fluid communication and mounted on opposite sides of a pivot axis and containing liquid having a low boiling point, said containers having sun shielding means positioned relative thereto to provide unequal solar radiation on the containers whenever the device is not aimed at the sun thereby causing greater vaporization of said liquid in one container which in turn causes transfer of liquid from that container to the other and rotation of the containers about the pivot until equal radiation is received by both containers, and means for maintaining center of gravity below the pivot axis to control motion around said pivot axis, the improvement which comprises:

differential cooling means for providing greater rate of heat dissipation from one container than that of the other, whereby the container with high heat dissipation can be placed in the easterly position and therefore will cool faster after sunset thereby causing transfer of liquid from the westerly container and automatic reorientation of the containers in preparation for sunrise.

4,175,392

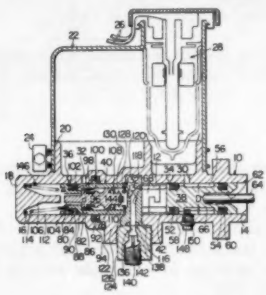
TANDEM MASTER CYLINDER ASSEMBLY

Yoshiro Morimoto, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Apr. 6, 1977, Ser. No. 785,031
Claims priority, application Japan, Apr. 16, 1976, 51-43942
Int. Cl.[2] B60T *11/06, 11/20*
U.S. Cl. 60—561 16 Claims

1. A tandem master cylinder assembly for use in split front and rear brake systems of an automotive vehicle, comprising a fluid reservoir for storing therein fluid for the brake systems; a cylinder body formed with an elongated cylinder bore and primary and secondary ports spaced apart from each other axially of the cylinder body for providing communication between said fluid reservoir and the cylinder bore; primary and secondary pistons interlocked with each other by axial and circumferential mating engagement therebetween and axially movable as a single unit within said cylinder bore, each of the primary and secondary pistons having a hollow axial end portion and being formed with a pair of axial slots open at the leading end of said end portion and diametrically opposite to each other across the center axis of each of the pistons, each of the slots in one of the pistons being contiguous to each of the

slots in the other of the pistons so that the pistons jointly form a pair of elongated slots each having closed opposite axial ends, the secondary piston being further formed with axial bore portions having different cross sectional areas; a floating piston axially movable within said bore portions, the primary, secondary and floating pistons jointly forming in said cylinder bore primary and secondary variable-volume pressure chambers communicable with said fluid reservoir through said primary and secondary ports, respectively, one of the pressure chambers being in communication with one of said front and rear brake systems and the other pressure chamber being in communication with the other brake system; sealing elements movable



with said primary and secondary pistons between respective positions isolating said primary and secondary variable-volume pressure chambers from said primary and secondary ports, respectively, and respective positions allowing the primary and secondary variable-volume pressure chambers to communicate with the primary and secondary ports, respectively; and a cross member which is fixedly connected to said cylinder body and which has a portion diametrically extending through said cylinder bore, the cross member being passed through said elongated slots jointly formed by said primary and secondary pistons for limiting the axial movement, in the opposite directions, of said floating piston relative to said cylinder body.

4,175,393

ROTARY VANE DRIVE WITH ROTATING CYLINDER

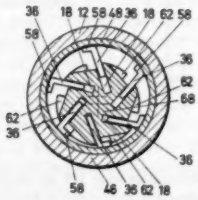
Engelbert Frank, Bahnhofstrasse 26/28, 6461 Hasselroth 1, Fed. Rep. of Germany

Filed Jan. 27, 1978, Ser. No. 872,936

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1977, 2704151

Int. Cl.[2] F01K *25/00*; F01C *1/00, 13/02*

U.S. Cl. 60—671 **8 Claims**



1. A drive apparatus utilizing a fluid pressure driven rotor; said apparatus comprising a casing having first and second end walls, a hollow cylindrical chamber defined within said casing between said end walls, a hollow cylindrical box rotatably positioned within said chamber, a cylindrical rotor of smaller diameter than said box and positioned eccentrically within said box, said cylindrical box being coaxial with said chamber and closely conforming thereto, said box having an open end adjacent the second end wall of the casing for communication of the fluid inlet and fluid outlet means with the interior thereof, a projecting shaft fixed axially to said rotor, said shaft being rotatably mounted in said first end wall and mounting said rotor for rotation within said chamber and said box, said rotor having a plurality of generally radial guide slots defined longitudinally therein and at spaced points thereabout, a segment slidably positioned in each slot for a selective generally radial extension and retraction of each segment relative to the eccentrically positioned rotor upon a rotation thereof, said segments, upon extension thereof from the respective slots, engaging the inner surface of said box for selective rotation of the box with the rotor, the segments each including opposed generally flat side faces and an enlarged portion at their outer ends having an outer surface conforming to the inner surface of the hollow cylindrical box, the eccentric positioning of the rotor placing the rotor near to one side of the chamber and defining a crescent-shaped working space about the rotor in the remainder of the chamber, said crescent-shaped working space having opposed ends, fluid inlet means through the second end wall communicating with the crescent-shaped working space toward one end thereof for the introduction of a pressurized fluid, said fluid inlet means having a nozzle configuration and being oriented to direct introduced fluid against the same side face of each of the segments serially to effect a rotation of the rotor in one direction, and fluid outlet means through the second end wall communicating with the crescent-shaped working space toward the second end thereof.

4,175,394

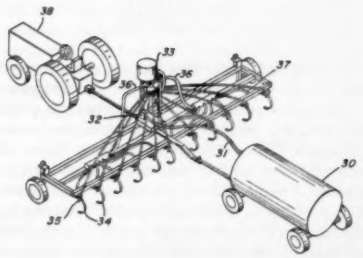
PROCESS AND APPARATUS FOR PRODUCING AND USING COLD AMMONIA

Robert A. Wiesboeck, Stone Mountain, Ga., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Jun. 1, 1978, Ser. No. 911,648

Int. Cl.[2] F17C *7/02*

U.S. Cl. 62—51 **42 Claims**



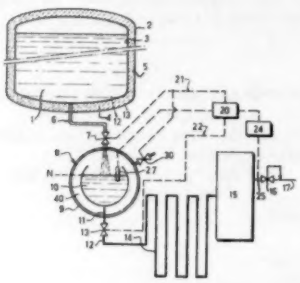
1. A method for carrying out the substantially adiabatic expansion of a pressurized stream of ambient-temperature liquid ammonia to produce a stream of cold liquid ammonia at a reduced pressure and a stream of cold gaseous ammonia at a reduced pressure, which comprises (1) introducing at a velocity of at least about 5000 feet per minute an inlet stream of partially decompressed liquid ammonia tangentially into an expansion chamber, the expansion chamber comprising a substantially vertically elongated barrier means located (a) substantially in the center of the horizontal planes of the expansion chamber and (b) in the path of the expansion cone of the inlet stream, which barrier means assists in imparting a spinning motion to the inlet stream and allows some liquid ammonia to flow down the barrier means and thereby improves the separation of the liquid and gaseous ammonia, (2) imparting a high velocity spinning motion to the liquid ammonia entering the chamber such that rapid flow is produced around the interior of the chamber to thereby provide rapid separation of the liquid and gaseous ammonia in the chamber, and wherein the expansion chamber is provided with an outlet useful for the removal of gaseous ammonia therefrom which outlet is located

above the paths of liquid flow to minimize the amount of liquid droplets being carried through the gaseous ammonia outlet and another outlet useful for the removal of cold liquid ammonia therefrom, the outlets being provided at opposite ends of the expansion chamber, (3) directing the flow of the cold reduced pressure liquid ammonia within the expansion chamber to the outlet useful for the withdrawal of cold reduced pressure liquid ammonia from the expansion chamber to effect separation between cold liquid ammonia and cold gaseous ammonia within the expansion chamber, and (4) withdrawing through the outlet useful for the removal of gaseous ammonia a stream of cold gaseous ammonia at reduced pressure and a stream of cold liquid ammonia at reduced pressure via the other outlet.

4,175,395
DISTRIBUTION OF GAS UNDER PRESSURE

Roger Prost, Saint Egreve, and Bernard Manhes, Versailles, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Dec. 20, 1977, Ser. No. 862,513
Claims priority, application France, Dec. 23, 1976, 76 38827
Int. Cl.[2] F17C *7/02*
U.S. Cl. 62—52 **8 Claims**



1. In apparatus for distributing gases under pressure, of the kind which comprises a storage tank for liquified gas, a distribution circuit under pressure which incorporates a heater and a pressure regulator and reducer, in which the said storage tank is designed for a pressure appreciably lower than the distribution pressure, and in which a confined enclosure of small capacity designed for a pressure at least equal to the distribution pressure is connected by ducts containing valves on the one hand to the said storage tank and on the other hand to the said heater in the distribution circuit, the improvement in which the enclosure of small capacity incorporates an inner receptacle to receive liquid from the storage tank, which is spatially separated from the conductive wall which is not insulated from the exterior of the said enclosure, the connection to the distribution circuit being made by a single duct which opens into the said inner receptacle at a low point.

4,175,396
CRYOGENIC EMBRITTLEMENT FREEZER WITH GAS LOCK

Keith A. Miller, Allentown, and Eric C. Osmundson, Bethlehem, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 19, 1978, Ser. No. 907,428
Int. Cl.[2] F25D *13/06*
U.S. Cl. 62—63 **9 Claims**

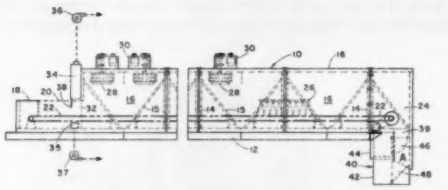
1. A method of operating a cryogenic, tunnel-type freezer having a product inlet and a product outlet comprising:

(a) conveying product to be embrittled from said inlet to said outlet,

(b) contacting product with a cryogenic liquid refrigerant in a contact zone to generate cold refrigerant gas within said tunnel,

(c) generating said gas at a rate sufficient to create a slightly superatmospheric pressure in said contact zone,

(d) mechanically sealing said product outlet with a gas lock to force said refrigerant gas to flow from said contact zone to said product inlet, wherein said step of mechanically sealing comprises alternately pivoting a pair of closure members between open and closed positions during normal operation of said freezer, and simultaneously pivoting both of said closure members to their open and closed positions for de-jamming said gas lock,



(e) circulating said refrigerant gas in contact with said product between said contact zone and said product inlet,

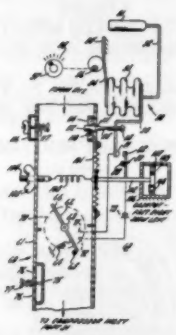
(f) creating a localized low pressure zone adjacent said product inlet, and

(g) withdrawing refrigerant gas through only said product inlet as a negative gas curtain.

4,175,397
CLOSED LOOP AIR CONDITIONING SYSTEM INCLUDING PRESSURIZATION BY BLOCKAGE AND ASPIRATION

Thomas C. Edwards, Cocoa Beach, and Amir L. Ecker, Cocoa, both of Fla., assignors to The Rovac Corporation, Rockledge, Fla.

Division of Ser. No. 769,958, Feb. 18, 1977, abandoned. This application Oct. 5, 1978, Ser. No. 948,973
Int. Cl.[2] F25B *23/00;* **F25D** *9/00*
U.S. Cl. 62—149 **23 Claims**



1. In an air conditioning system for an enclosed spaced, the combination comprising a compressor having an inlet port and an outlet port, an expander having an inlet port and an outlet port, the compressor and expander having rotor means including vanes for positive compression and expansion as the rotor means is driven, a primary heat exchanger connected between the compressor outlet port and the expander inlet port, a secondary heat exchanger connected between the expander outlet port and the compressor inlet port to complete a closed loop having a charge of air, one of the heat exchangers being thermally coupled to the enclosed space, a blocking valve associated with the secondary heat exchanger and in the path of the

air stream in the loop, an injector valve adjacent the compressor inlet port and capable of communication with the ambient atmosphere, means for momentarily closing the blocking valve thereby to create a relative vacuum at the compressor inlet port, and means for coincidentally opening the injector valve so that additional air is aspirated to join that which is already in the closed loop thereby to raise the pressure in the secondary heat exchanger substantially above atmospheric pressure to increase the heat rate of the system.

4,175,398

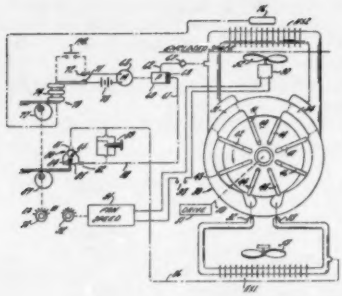
CONTROL SYSTEM FOR AIR CONDITIONER

Thomas C. Edwards, Cocoa Beach, and Amir L. Ecker, Cocoa, both of Fla., assignors to The Rovac Corporation, Rockledge, Fla.

Continuation-in-part of Ser. No. 769,958, Feb. 18, 1977. This application Dec. 8, 1977, Ser. No. 858,241

Int. Cl.[2] F25B *45/00*

U.S. Cl. 62—172 19 Claims



1. In an air conditioning system for an enclosed space, the combination comprising a compressor having an inlet port and an outlet port, an expander having an inlet port and an outlet port, the compressor and expander having rotor means including vanes coupled together for positive compression and expansion as the rotor means is driven, a primary heat exchanger connected between the compressor outlet port and the expander inlet port, a secondary heat exchanger connected between the expander outlet port and the compressor inlet port to complete a closed loop having a charge of single phase gaseous refrigerant, the refrigerant being constantly in the gaseous state throughout the loop, one of the heat exchangers being thermally coupled to the enclosed space, a source of single phase gaseous refrigerant, heat rate control means for changing intermittently the heat rate of the system while maintaining the refrigerant in a gaseous phase throughout the loop under all operating conditions, said heat rate control means including an auxiliary pump of the positive displacement type interposed between the source and the loop and having a driving motor for progressively injecting single phase refrigerant from the source into the loop to increase the pressure in the secondary heat exchanger to substantially above the atmospheric level, control means including a control device correctively settable in response to the temperature of the air in the enclosed space to produce a control signal for energizing intermittently the driving motor to pump single phase gaseous refrigerant into the loop to increase the pressure in the loop and thereby increase the heat rate of the system, and bleeding means for progressively bleeding single phase refrigerant from the loop back to the source for decreasing the loop pressure and thereby decreasing the heat rate of the system so that an equilibrium pressure tends to be established in the secondary heat exchanger which is in accordance with thermal load on the system.

4,175,399

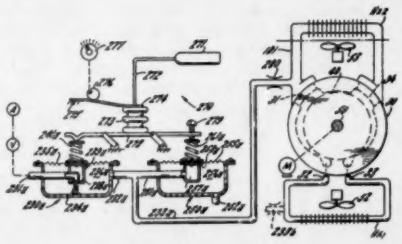
CLOSED LOOP AIR CONDITIONING SYSTEM HAVING AUTOMATIC PRESSURIZING MEANS FOR VARIATION OF HEAT RATE

Thomas C. Edwards, Cocoa Beach, and Amir L. Ecker, Cocoa, both of Fla., assignors to The Rovac Corporation, Rockledge, Fla.

Filed Feb. 18, 1977, Ser. No. 769,958

Int. Cl.[2] F25D *9/00*

U.S. Cl. 62—172 16 Claims



1. In an air conditioning system for an enclosed space, the combination comprising a compressor having an inlet port and an outlet port, an expander having an inlet port and an outlet port, the compressor and expander having rotor means including vanes coupled together for positive compression and expansion as the rotor means is driven, a primary heat exchanger connected between the compressor outlet port and the expander inlet port, a secondary heat exchanger connected between the expander outlet port and the compressor inlet port to complete a closed loop having a charge of single phase gaseous refrigerant, the refrigerant being constantly in the gaseous stated throughout the loop, one of the heat exchangers being thermally coupled to the enclosed space, control means for producing an output signal in response to a change in the temperature of the controlled space, a source of said single phase gaseous refrigerant, heat rate control means for changing intermittently the heat rate of the system while maintaining the refrigerant in a gaseous phase throughout the loop under all operating conditions, said heat rate control means including means for progressively injecting said single phase refrigerant from the source into the loop to increase the pressure in the secondary heat exchanger to substantially above the atmospheric level, control means including a control device correctively settable in response to the temperature of the air in the enclosed space to produce a control signal for intermittently energizing the injecting means to inject such single phase gaseous refrigerant into the loop to increase the pressure in the loop and thereby increase the heat rate of the system, and bleeding means for progressively bleeding single phase refrigerant from the loop back to the source for decreasing the loop pressure and thereby decreasing the heat rate of the system so that an equilibrium pressure tends to be established in the secondary heat exchanger which is in accordance with thermal load on the system.

4,175,400

AIR CONDITIONING SYSTEM EMPLOYING NON-CONDENSING GAS WITH ACCUMULATOR FOR PRESSURIZATION AND STORAGE OF GAS

Thomas C. Edwards, Cocoa Beach, Fla., and Amir L. Ecker, Dallas, Tex., assignors to The Rovac Corporation, Rockledge, Fla.

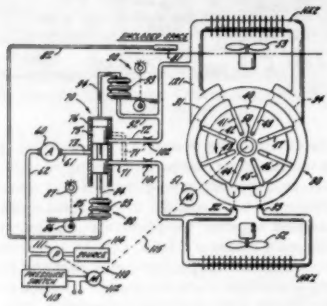
Continuation-in-part of Ser. No. 769,958, Feb. 18, 1977. This application Nov. 8, 1978, Ser. No. 958,650

Int. Cl.[2] F25B *9/00*

U.S. Cl. 62—174 11 Claims

1. In an air conditioning system for an enclosed space, the combination comprising a compressor having an inlet port and

an outlet port, an expander having an inlet port and an outlet port, the compressor and expander having rotor means including vanes coupled together for positive compression and expansion as the rotor means is driven, a primary heat exchanger connected between the compressor outlet port and the expander inlet port, a secondary heat exchanger connected between the expander outlet port and the compressor inlet port to complete a closed loop having a charge of a non-condensing gas, the loop being free of any intentional restriction in the form of a capillary or the like, one of the heat exchangers being thermally coupled to the enclosed space, an accumulator holding an auxiliary charge of the pressurized gas, the pressure of the gas in the accumulator being in an operating range lower than the operating pressure existing in the primary heat exchanger and higher than the operating pressure existing in the secondary heat exchanger, first intermittently operated valve means for coupling the accumulator to the secondary heat



exchanger so that auxiliary gas is injected into the closed loop thereby to raise the pressure in the secondary heat exchanger above the atmospheric level to increase the heat rate of the system, and second intermittently operated valve means for coupling the accumulator to the primary heat exchanger so that air is bled from the primary heat exchanger to the accumulator thereby to lower the pressure in the loop to decrease the heat rate of the system, a thermostat in the enclosed space and having a responsive member which moves in opposite directions as its temperature in the space respectively rises and falls, the first and second valve means both being coupled to the responsive member for alternative operation as the responsive member moves in its opposite directions thereby correctively varying the heat rate so as to maintain the temperature in the space substantially constant, and auxiliary means for replenishing the accumulator with gas so that the pressure therein remains in the operating range.

4,175,401

REFRIGERATION SYSTEM

Raymond McManus, R.F.D. 5, Carver, Mass. 02330

Filed Jan. 22, 1979, Ser. No. 5,449

Int. Cl.[2] **F25D** *17/00*

U.S. Cl. 62—180 **4 Claims**

1. An improved refrigeration system for the use of cool ambient air in the atmosphere, which system comprises in combination:

(a) a closed refrigerator container to be maintained at a desired cool temperature;

(b) refrigeration means which includes a compressor to provide for a source of cool refrigerated air for the closed container and including fan means to introduce cool air within the closed container;

(c) an inside thermostatic-control means within the closed container to monitor the temperature within the closed container;

(d) a duct system to control the introduction of cool ambient air of the atmosphere into the closed container, which duct system comprises at least three modular duct units, the duct units in combination providing for a dual-air passageway within the duct units to provide for air communication between the interior of the closed container and the ambient air of the outside atmosphere, which dual passageway comprises

(i) a first passageway having a first inlet and a first outlet to provide for the passage of warm air from the interior of the closed container into the first inlet and to the first outlet and to discharge the warm air to the environment,

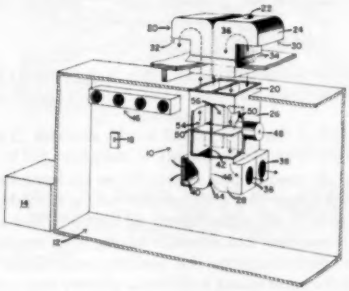
(ii) a second passageway having a second inlet and a second outlet to provide for the passage of cool ambient air from the atmosphere into the interior of the closed container from the second inlet to the second outlet,

(iii) which duct system includes an outside duct unit placed in the ambient outside-air atmosphere and having a hooded passageway over the first outlet and second inlet,

(iv) a control duct unit which comprises a damper within the control duct, the damper adapted to move between a closed position and an opened position, the opened position permitting the passage of air through the first and second passageways and the closed position preventing the passage of air through the first and second passageways,

(v) an electric motor to control the position of the damper means, and

(vi) an interior duct unit which comprises the first inlet



and the second outlet and includes a motorized fan means in the second outlet means to draw cool ambient air from the outside atmosphere through the second inlet and to discharge cool ambient air from the outside atmosphere into the closed container;

(e) an outside thermostatic-control means to sense the temperature of the ambient air in the outside atmosphere; and

(f) electrical control means in electrical communication with the inside and outside thermostatic-control means, the motor, operating the damper means, the interior fan means and the refrigeration means, including the compressor and refrigeration fans, whereby, when the ambient air in the outside atmosphere falls below a designated cool temperature, the compressor and refrigerator fans are stopped and the motor of the damper means is actuated to place the damper in an opened position and the interior fans of the interior duct unit are actuated, whereby cool ambient air from the outside atmosphere is drawn into the second inlet and is discharged from the second outlet into the closed container, and warm air within the closed container is withdrawn from the first inlet and is discharged to the outside atmosphere through the second outlet, until the temperature of the closed container reaches a desired, preselected, low temperature, at which time the first thermostatic-control means provides for the actuation of the motor for the damper to close the damper and to stop the inside fans of the inside duct unit, and, thereafter, when the closed container temperature rises above the prese-

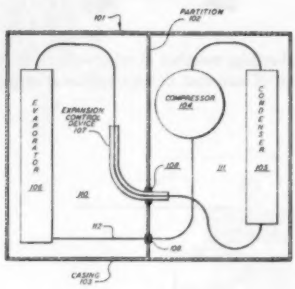
lected cool temperature within the closed container, another interior thermostatic device actuates the refrigerating fans, unless the ambient air in the outside atmosphere is at or below the preselected temperature, at which time the process of introducing cooler ambient air from the atmosphere is repeated, thereby maintaining a cool temperature in the closed container by the use of cooler ambient air when available.

4,175,402

CAPILLARY PLUG BUTTON

James R. Hile, Kirkville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 29, 1977, Ser. No. 828,447
Int. Cl.[2] F25D *29/00*
U.S. Cl. 62—263 **12 Claims**



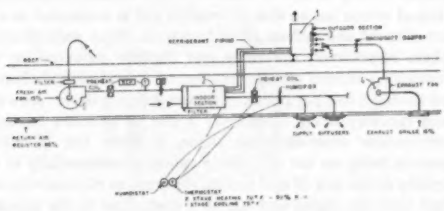
1. A refrigeration machine comprising a condenser, an evaporator, and a compressor forming a refrigeration circuit, an internal wall of the refrigeration machine having an opening therethrough, at least one capillary tube and a capillary plug button for securing the capillary tube including a retainer plate having apertures in which the capillary tube may be secured, said retainer plate having a larger diameter than the opening in the wall and leg means extending from the retainer plate through the opening to fixedly hold the retainer plate to the wall such that the retainer plate contacts one side of the wall and the leg means contacts the opposite side of the wall, said leg means including at least two portions spaced from each other and capable of inward deformation for insertion of the leg means through the opening in the wall.

4,175,403

HEAT RECOVERY SYSTEM

Jon Lunde, 1227 Greyrock Crescent, Ottawa, Ontario, Canada (K2C 2A6)

Filed Jun. 6, 1977, Ser. No. 804,056
Claims priority, application Canada, Jun. 7, 1976, 254216
Int. Cl.[2] F25B *13/00*; F28D *5/00*; F25D *17/06*
U.S. Cl. 62—324 **6 Claims**



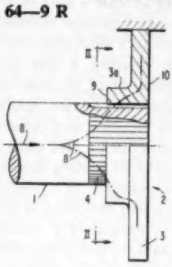
1. A heat recovery system for an air conditioning system of a building, operating in the heating mode, including an outdoor heat exchanger and an indoor heat exchanger interconnected by refrigerant piping, the improvement comprising combining with said system an indoor exhaust air system having an indoor exhaust air moving means connected to an outdoor air diffuser, the outdoor heat exchanger being traversed by a flow of outdoor air forced by air moving means associated with the outdoor heat exchanger, said diffuser being located adjacent said outdoor heat exchanger so that the exhaust air from the diffuser is passed through and mixed with outdoor air before passing through the outdoor heat exchanger to recover heat from the exhaust air for reuse in the air conditioning system, thereby reducing the overall energy requirement of the air conditioning system in the heating mode.

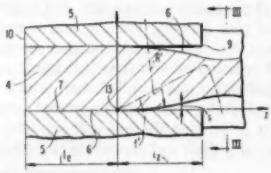
4,175,404

SPLINE SHAFT CONNECTION

Hans-Joachim Schopf, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 15, 1977, Ser. No. 860,946
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1976, 2656946
Int. Cl.[2] F16D *3/18, 3/54*
U.S. Cl. 64—9 R **10 Claims**





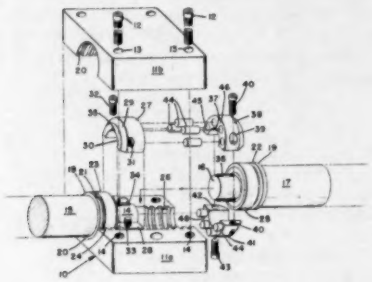
1. A spline shaft connection between a shaft and a hub with a large number of axially extending tooth and counter tooth means form-lockingly engaging into one another, a tooth flank clearance being provided between the flanks of the mutually contacting tooth and counter tooth means that becomes larger along the direction of the axial dimension and is dimensioned of the order of magnitude of the elastic deformation under load of tooth or counter tooth means, characterized in that a centering length is provided wherein the tooth means and counter tooth means engages into one another at least approximately uniformly and substantially without clearance over a substantial portion of the axial extent of the spline shaft connection and are constructed in a cutting length constituting the remaining part of the axial extent with a tooth flank clearance that becomes larger in the direction toward the end of the spline shaft connection which is opposite to the flow of forces, whereby the enlargement of the tooth flank clearance follows such a relationship that the tooth flank clearance value is a function of the axial coordinate whose first derivative along the axial coordinate is substantially equal to zero at the juncture of the centering and cutting lengths.

4,175,405

SHAFT COUPLING

Joseph F. Smith, and Joseph R. Smith, both of Greensboro, N.C., assignors to PEM-IMS, Inc., N.C.

Filed Sep. 12, 1977, Ser. No. 832,185
Int. Cl.[2] F16D *3/48, 3/00*
U.S. Cl. 64—10 **3 Claims**



1. A shaft coupling comprising at least a pair of releasably connected articulated complementary closure members and a shaft bearing housing, a shaft having a shaft end section bearingly supported in said base for rotation, a first split collar including at least a pair of complementary sections releasably mounted on and encircling said shaft end section, said first split collar having means for releasably securing said collar complementary sections together for retention on said shaft end section and said first collar having a shaft joining face side, said shaft joining face side having a plurality of cylindrical pin-receiving recesses, a second split collar including at least a pair of complementary sections for cooperatively retaining and encircling a shaft to be coupled, said second split collar having means for releasably securing said complementary sections together for retention on said shaft section to be coupled, in juxtaposition with said first surface, said second split collar having a shaft joining face side facing said first surface, said second split collar face side having a plurality of spaced cylindrical pin-receiving recesses, and a series of removable cylindrical pins forming locking means extending into said collar section recesses of said first and second split collars whereby shaft rotation of said first collar will transmit rotation to said second collar and coupled shaft which may be secured by said second collar and disengagement and removal of one split collar or portion thereof will provide for transverse displacement of a shaft end section in the coupling.

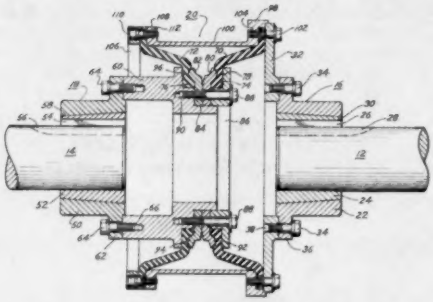
4,175,406

THRUST CANCELLING SHAFT COUPLING

Holmes A. Downey, Bremen, Ind., assignor to Reliance Electric Corporation, Mishawaka, Ind.

Filed Nov. 16, 1977, Ser. No. 852,152
Int. Cl.[2] F16D *3/78*
U.S. Cl. 64—13 **11 Claims**

1. A thrust cancelling shaft coupling comprising a first rotatable element with a flange thereon, a second rotatable element with a flange thereon and in substantially axial alignment with said first element, an axially extending member on said second element projecting toward said first element but spaced therefrom and being smaller in diameter than the periphery of the flange on the first element, a first generally frustoconical flexible torsional element connected at its larger end to the flange on the first rotatable element and at its smaller end to said axially extending member, an axially extending annular means spaced radially outwardly from and overlapping said axially extending member and being of a diameter substantially the same as the diameter of the larger end of said torsional element, means connecting one end of said annular means to the flange of said first rotatable element, and a second generally frustoconical flexible torsional element connected at its larger end to the other end of said annular means and at its smaller end to



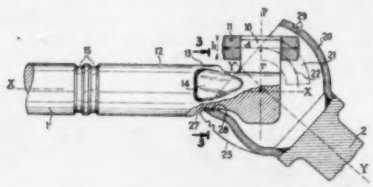
said axially extending member in relatively close proximity to the smaller end of said first flexible torsional element.

4,175,407

HOMOKINETIC JOINT ALLOWING A LARGE ANGULAR DISPLACEMENT

Michel Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Filed Feb. 23, 1978, Ser. No. 880,488
Claims priority, application France, Mar. 4, 1977, 77 06427
Int. Cl.[2] F16D *3/30*
U.S. Cl. 64—21 **11 Claims**



1. A homokinetic joint for a transmission comprising a driving first element having an axis of rotation, a driven second element having an axis of rotation, a first member constituting a tripod which has an axis of rotation and is connected to said first element and defines three trunnions, three part-spherical rollers respectively rotatably and slidably mounted on the trunnions, a second member connected to said second element and having a free peripheral edge and defining three raceways, each raceway being formed by a pair of grooves having a part-circular cross-sectional shape, a mean line of which grooves being an arc of a circle centered substantially in the vicinity of the axis of said second element, an element which is rigid with the tripod and has, in a zone close to the tripod, a substantially triangular cross-sectional shape approximately constituting the envelope of said free edge of the second member when the joint operates with an angular displacement between said first and second elements close to the maximum angular displacement.

4,175,408

APPARATUS FOR ABSORBING OIL PRESSURE IN AN IMPACT TYPE TOOL

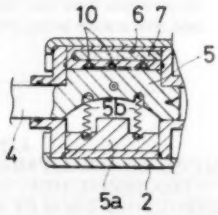
Kaname Kasai; Takaji Mukumoto, both of Kawagoe; Toshikazu Asakura, Sayama, and Ryoji Ueda, Iruma, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1977, Ser. No. 857,666

Claims priority, application Japan, Dec. 10, 1976, 51-164722[U]

Int. Cl.[2] F16D *3/80*

U.S. Cl. 64—26 **4 Claims**



1. An apparatus for absorbing oil pressure in an impact tool employing an eccentric oil chamber, said chamber being formed in a rotatable cylinder connected to an air motor drive having a rotor connected to a spindle, wherein: said rotor by moving relative to said oil chamber in predetermined angular position thereby urges oil into respective partitioned chambers formed outside of the rotor to impart an impact torque to said rotor; and at least one longitudinally extending space chamber formed in the cylinder is in communication with the oil chamber being filled with a closed cell type foam rubber.

4,175,409

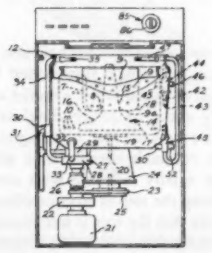
CLOTHES WASHING MACHINE

Everett D. Morey, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Continuation-in-part of Ser. No. 695,585, Jun. 14, 1976, abandoned. This application Nov. 4, 1977, Ser. No. 848,536

Int. Cl.[2] D06F *37/00*

U.S. Cl. 68—4 **8 Claims**



1. In a vertical axis clothes washing machine having wash, rinse, and spin extraction operations including a tub, an agitator, a first basket within the tub, a second basket, having a side wall with a plurality of openings particularly at the bottom thereof, disposed within the first basket and positioned on the agitator for movement therewith, water supply means for feeding hot and cold water into the machine, electrically powered drive means for operating the agitator to effect washing of the fabrics and for rotating the baskets to centrifugally extract water from the fabrics, communication means to allow water to flow from the baskets into the tub, recirculating means arranged to take water from the tub and recirculate it into the baskets during the wash and rinse operations, the improvement comprising:

(a) a separate cycle of a continuous wash and rinse operation followed by a spin extraction operation for washing clothes in only the second basket including;

(i) means to continuously introduce fresh water into the second basket during the continuous wash and rinse operation,

(ii) means to continuously flow wash and rinse water from the second basket through the openings therein into the first basket so that said second basket does not fill to a level beyond that necessary to maintain the clothes therein in a sopping wet condition and then from the first basket into the tub,

(iii) diverting means in the recirculation means to continuously direct water to drain from the tub during the combined wash and rinse operation,

(b) means to oscillate back and forth the small basket with the agitator in unison therewith during the continuous wash and rinse operation,

(c) means to reduce the temperature of the fresh water introduced into the second basket part way through the continuous wash and rinse operation to gradually reduce the temperature of the clothes, and

(d) means to stop the flow of fresh water into the second basket prior to the spin extraction operation and take water from the tub and direct the water to drain.

4,175,410

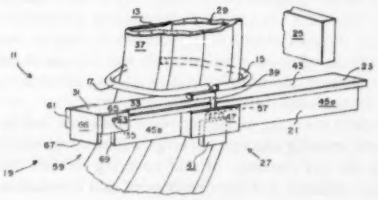
VEHICLE WHEEL ENGAGEABLE BLOCKING DEVICE

John E. Schwaiger, 7556 Raleigh-LaGrange Rd., Cordova, Tenn. 38018

Filed Nov. 3, 1977, Ser. No. 848,279

Int. Cl.[2] B60R *25/00*

U.S. Cl. 70—226 **6 Claims**



1. A locking device for lockable engagement with a vehicle wheel, said locking device comprising lock-bar means for thwartable engagement with merely one wheel of the vehicle whereby movement of the vehicle is impeded therewith, said lock-bar means intended to be disposed in an essentially parallel arrangement with respect to the rotating axis of the wheel and includes inner and outer ends with the inner end thereof reaching a predetermined distance beyond the inner side-wall of the wheel, inner arcuate arm means disposed substantially intermediate said lock-bar means and being fixedly attached thereto for contiguous engagement with the inner side-wall of the wheel, hingeplate means hingedly attached at the outer end of said lock-bar means for facilitating installing said locking device onto the wheel with said hingeplate means being mov-

able between locked and unlocked positions, outer arcuate arm means fixedly attached to said hingeplate means for movement therewith and for contiguous engagement with the outer sidewall of the wheel when said hingeplate means is in the locked position thereof, hasp means for coupling said hingeplate means and said lock-bar means one with the other, and lock means engageable with said hasp means for precluding unjustifiable movement of said hingeplate means.

4,175,411

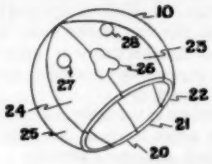
LIGHTWEIGHT COSTUME HEAD

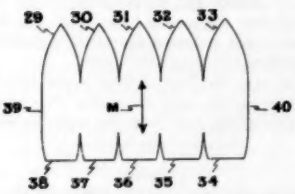
Terry M. Allen, 3021 Millcreek Rd., Salt Lake City, Utah 84404, and William D. Derfler, 440 N. 225 E., North Salt Lake City, Utah 84054

Division of Ser. No. 575,496, May 8, 1975, Pat. No. 4,099,271. This application Jan. 13, 1978, Ser. No. 869,284

Int. Cl.[2] **A42B** *1/04*

U.S. Cl. 2—173 **11 Claims**





1. An enveloping costume head comprising:

(a) a flexible, crushable, head-enveloping foundation having a substantially circular access opening therein for inserting the head of the wearer, the rim of said opening adapted to rest on the shoulders of a wearer and a snout opening and eye openings therein, said foundation consisting essentially of elastomeric foam sections having a minimum thickness of about one-half inch and having at least ten cuts therein, the edges of said cuts being adhered together to form a substantially spherical shape;

(b) a cloth covering enclosing said foundation, and having a snout opening and eye openings therein, said snout opening and eye openings of said covering located over said snout opening and eye openings of said foundation.

4,175,412

PROCESS AND INSTALLATION FOR MECHANICAL DESCALING STEEL WIRE

Jean Bernot, Saint-Dizier, France, assignor to Trefilunion, Saint-Dizier, France

Filed Mar. 10, 1978, Ser. No. 885,160

Claims priority, application France, Mar. 11, 1977, 77 07579

Int. Cl.[2] **B21B** *45/04;* **B24C** *3/12*

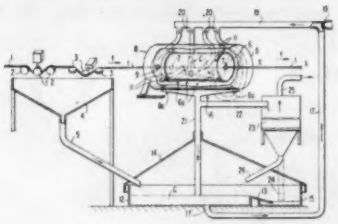
U.S. Cl. 72—40 **9 Claims**

1. In a process of removing iron oxide scale from steel rod, including the steps of bending said wire to cause a portion of said scale to be detached from said rod surface, collecting said scale so detached from said rod surface, and projecting collected scale against said rod at a point thereon downstream from the point where said bending occurs, the improvement comprising:

re-collecting said scale after it is projected against said rod;

removing from re-collected scale, scale particles below a predetermined size;

mixing said re-collected scale having scale particles above



said predetermined size with scale which has not been projected against said rod; and

projecting mixed projected and unprojected scale in an amount greater than the amount of scale originally detached from said rod against said rod at a point thereon downstream from the original point of detachment only said mixed scale being projected against said rod.

4,175,413

METHODS AND APPARATUSES FOR FORMING BY FRICTIONAL HEAT AND PRESSURE HOLES SURROUNDED EACH BY A BOSS IN A METAL PLATE OR THE WALL OF A METAL TUBE

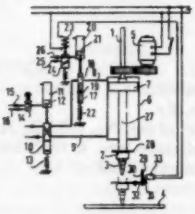
Johannes A. van Geffen, Apeldoorn, Netherlands, assignor to Technisch Handels- en Adviesbureau van Geffen B.V., Apeldoorn, Netherlands

Filed Jan. 24, 1978, Ser. No. 871,974

Claims priority, application Netherlands, Jan. 27, 1977, 7700871

Int. Cl.[2] **B21D** *28/36*

U.S. Cl. 72—71 **7 Claims**

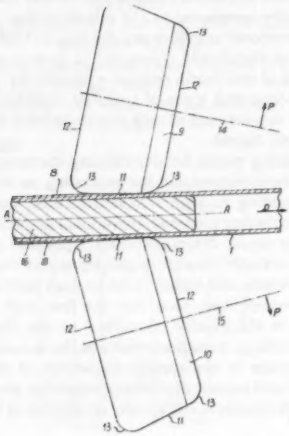


1. A method of forming by frictional heat and pressure a hole of predetermined size and shape surrounded by a boss in a metal plate or the wall of a metal tube with the aid of a piercing tool rotating rapidly about its longitudinal axis and moving through said plate or tube wall, said piercing tool being coaxially attached to the rotatable spindle of a machine tool, of which the spindle is axially movable with controllable feed, said method comprising the step of so controlling the axial feed of the tool as to ensure that the tool is fed, during a determined time from at least the point of time, at which it comes into contact with the plate or the tube wall, with a speed which is lower than a given speed and after that time is fed with a speed which is higher than said given speed.

4,175,414
SMOOTHING ROLLING MILL

Pierre Peytavin, Neuilly-sur-Seine, France, assignor to Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies), Paris, France

Filed Feb. 21, 1978, Ser. No. 879,808
Claims priority, application France, Feb. 25, 1977, 77 05566
Int. Cl.² B21B *19/10*
U.S. Cl. 72—96 **7 Claims**

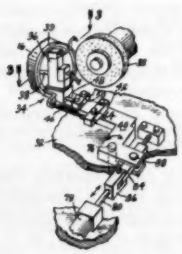


1. In a tube smoothing rolling mill having a back up mandrel within a tube blank to be rolled, means for rotating the tube blank about its longitudinal axis, means for displacing the tube axially, and smoothing rollers positioned symmetrically to the axis of displacement of the tube, the improvement comprising, two smoothing rollers positioned diametrically of the tube and each having a tube engaging surface in the form of a frustum of a cone, said surface of each such roller merging with end surfaces of the roller at zones of curved section, and shaft means mounting said rollers for rotation about axes inclined with respect to the axis of displacement of the tube, said axes converging in the direction of displacement of the tube.

4,175,415
FINISHING TOOL

Richard T. Knorring, Worcester, Mass., assignor to Cincinnati Milacron-Heald Corporation, Worcester, Mass.

Filed Aug. 18, 1978, Ser. No. 934,904
Int. Cl.² B21H *1/00*
U.S. Cl. 72—101 **10 Claims**

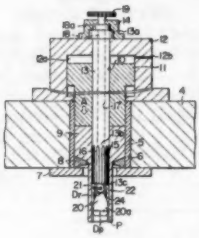


1. A finishing tool assembly for finishing a workpiece, comprising:
(a) a base;
(b) a housing pivotally mounted upon the base about an axis;
(c) a finishing tool, said tool being in the form of an elongated rod with a substantially circular cross-section extending from said housing in a direction transverse to the axis of the housing pivot and having a workpiece interface on its periphery;
(d) means for effectuating relative movement between said housing and a workpiece; and
(e) means for oscillating said housing about its pivotal axis in coordination with said effectuating means.

4,175,416
APPARATUS FOR MANUFACTURING HEAT TRANSFER TUBES

Toshihiko Fukushima, Shimoinayoshi; Kunio Fujie, Tokyo; Akira Arai, Sakuramura; Nobukatsu Arai, Ushikumachi, and Kimio Kakizaki, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 11, 1978, Ser. No. 868,664
Claims priority, application Japan, Jan. 18, 1977, 52-3644
Int. Cl.² B21C *23/10, 25/04, 1/34, 3/00*
U.S. Cl. 72—254 **19 Claims**



1. Apparatus for manufacturing a heat transfer tube comprising means for conveying a material tube longitudinally, a first mandrel for forming alternate ribs and grooves on the inside of said tube, a second mandrel for forming cuts into said ribs and forcibly bending and joining said ribs successively to the adjacent ones, and a die, said first mandrel having grooves and ridges on the surface for inversely forming said ribs and grooves on the inner wall surface of said tube and also having a longitudinally extending bore coaxial with a stem of said first mandrel, said second mandrel including a tool for forming cuts at given intervals in the ribs formed on the inside of said tube by the grooves and ridges of said first mandrel and also including a tool for forcibly bending the crests of said ribs with said cuts sidewise into pemanent contact with intermediate parts of the adjacent ribs successively and thereby joining said ribs altogether, said second mandrel being inserted into said bore of said first mandrel in such a manner that said tools for forming cuts and joining said ribs to the adjacent ones are both exposed from the end of said first mandrel, said die being located in the vicinity of the portion of said first mandrel formed with said grooves and ridges.

4,175,417
WORKPIECE FORMING MACHINE

Leo H. Vergnani, 7 Spencer St.; John B. Ferrero, 916 Suffield St., both of Agawam, Mass. 01001, and Ernest M. Cassanelli, 93 Grochmal Ave., Springfield, Mass. 01051

Filed Dec. 1, 1977, Ser. No. 856,409
Int. Cl.² B21D *22/00*
U.S. Cl. 72—356 **1 Claim**

1. In apparatus for sequentially cold forming a work by changing the configuration thereof through a step-by-step application thereto of opposing mechanical forces, the improvement comprising:
a frame,
a drive motor,
a multiposition turret rotatably mounted in vertical disposition centrally of the frame and about a horizontally-

extending central axis and having a plurality of spaced circularly-arranged work cavities extending horizontally therethrough from one vertical face to the opposite vertical face,

a die receivable in each work cavity,

a cam-operated multistation indexing mechanism driven by the drive motor and rotatively supporting the turret for intermittently rotating and cyclically indexing the turret at stations through a series of sequential angular steps,

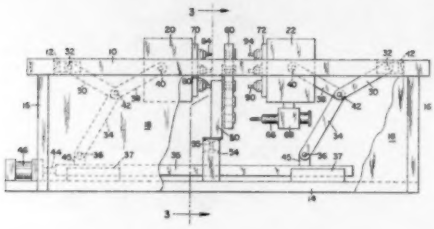
a ram vertically-disposed relative to the frame on each side of the turret,

a pair of horizontally-extending ram rails mounted on the frame for supporting the rams coaxially in slidable relationship alternately toward each other in forming strokes and away from each other in non-forming strokes,

a shuttle bar cylinder and piston,

power means for cyclically actuating the piston in alternating forming and non-forming strokes,

a horizontally-extending shuttle bar disposed centrally of the frame and connected to and driven by the piston and reciprocable linearly in forming and non-forming strokes,



a moving assembly at each end of the frame outboard of a respective ram and including a trio of pivotally interconnected power links consisting of an upper power link pivotally interconnected with the frame and a lower power link pivotally interconnected with the shuttle bar and a forward link pivotally interconnected with the respective ram for effecting simultaneous movements of the rams toward each other in forming strokes and away from each other in non-forming strokes,

a tool plate mounted on each ram for supporting a plurality of circularly arranged tools extendable therefrom in planes normal thereto toward the respective confronting vertical turret face,

each tool of the tool plate being disposed in a plane coaxial with the opposed tool of the other tool plate in a tool-couple relationship and with the axis of one of the turret work cavities,

with turret rotation transferring a work to successive stations of operation along a curvilinear path preparatory to the simultaneous linear reciprocation of a pair of the tools toward the work at the station.

4,175,418

TEMPERATURE MONITORING AND TEMPERATURE DIFFERENTIAL CONTROL DEVICE

Sylvester L. Steffen, R.R. 3, New Hampton, Iowa 50659, and Duaine L. Bollwitt, Monticello, Iowa, assignors to S. L. Steffen, New Hampton, Iowa

Filed May 8, 1978, Ser. No. 903,815

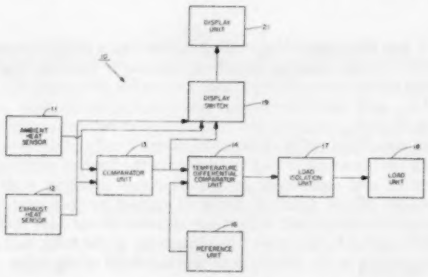
Int. Cl.[2] **G01K** *1/00*

U.S. Cl. 73—342 **15 Claims**

1. Apparatus comprising:

first sensing means for determining the temperature of a first environment and for producing an output voltage corresponding to such temperature said first sensing means including a first operational amplifier having an inverting input, a non-inverting input and an output, a first voltage transducer unit having an output voltage, and first, second, third and fourth resistors each having a first lead and a second lead, such that the first lead of said first resistor is electrically connected to the output of said first voltage transducer unit and the second lead of said first resistor is electrically connected to the inverting input of said first operational amplifier, the first lead of said second resistor is electrically connected to the inverting input of said first operational amplifier and the second lead of said second resistor is electrically connected to the output of said first operational amplifier, the first lead of said third resistor is electrically connected to the non-inverting input of said first operational amplifier and the second lead of said third resistor is electrically connected to ground potential, the first lead of said fourth resistor is electrically connected to the non-inverting input of said first operational amplifier and the second lead of said fourth resistor is electrically negatively biased;

second sensing means for determining the temperature of a second environment and for producing an output voltage corresponding to such temperature said second sensing means including a second operational amplifier having an inverting input, a non-inverting input and an output, a second voltage transducer unit having an output, a fifth, sixth, seventh, and eighth resistors each having a first lead and a second lead, such that the first lead of said fifth resistor is electrically connected to the output of said second voltage transducer unit and the second lead of said fifth resistor is electrically connected to the inverting input of said second operational amplifier, the first lead of said sixth resistor is electrically connected to the output of



said second operational amplifier, the first lead of said seventh resistor is electrically connected to the non-inverting input of said second operational amplifier and the second lead of said seventh resistor is electrically connected to ground potential, the first lead of said eighth resistor is electrically connected to the non-inverting input of said second operational amplifier and the second lead of said eighth resistor is electrically negatively biased;

first comparator means operably connected to said first and second sensing means for comparing the voltage outputs therefrom and for producing an output voltage corresponding to the temperature differential between the first and second environment;

adjustable reference means for selectively providing an output voltage corresponding to a desired temperature differential;

second comparator means operably connected to said first comparator means and said adjustable reference means for comparing the voltage outputs therefrom and for producing a hysteresis type of "High" or "Low" switching output voltage corresponding to the difference between (a) the temperature differential between the first and second environment, and (b) the desired temperature differential;

a load switch for activating a load responsive to the "High" and "Low" voltage output of said second comparator means;

a display switch selectively and operably connected to the output of said first sensing means, the output of said sec-

ond sensing means and the output of said first comparator means; and

a display means operably connected to said display switch for producing a visual display of the temperature of the first environment, the temperature of the second environment and the temperature differential between the first and second environment, said display means including means for producing a visual display of the temperature in degrees Fahrenheit.

4,175,419

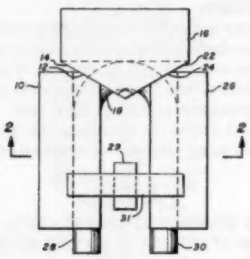
NO-SIZE SQUEEZING OF 180 DEGREE BOILER-TUBE RETURN BENDS

Thomas L. Mabery, Chattanooga, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 31, 1978, Ser. No. 891,958

Int. Cl.[2] B21D *7/03*

U.S. Cl. 72—383 **1 Claim**



1. An apparatus for reducing the bend radius of a U-shaped tube having parallel, longitudinal legs joined by a bent section, comprising: a back die hollowed to form a chamber that is shaped to accommodate a least a center of the bent section of the tube and to support the entire circumference of the tube at the center of the bent section, means for squeezing the tube by forcing the legs toward each other but keeping them generally parallel, thereby reducing the bend radius of the bent section and extending the legs longitudinally, the squeezing means including a pair of squeeze dies, each having a tube-engaging surface, the dies being oriented so that the tube-engaging surfaces are generally parallel and face each other, for squeezing a U-shaped tube by engaging the legs and moving them together, each squeeze die including a squeeze-die slide surface, the back die including back-die slide surfaces that are shaped to mate with and positioned to slidably engage the squeeze-die slide surfaces, the slide surfaces being angled such that there is no relative longitudinal movement between the squeeze dies and the legs of the tube when the squeeze dies are forced together.

4,175,420

SAFETY TIE DOWN FOR A PULLING APPARATUS

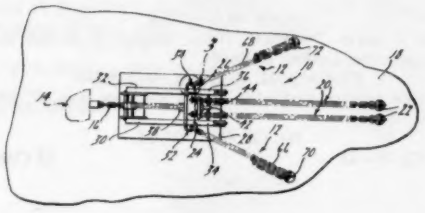
Charles J. Kuhn, 10520 Plainview Ave., Tujunga, Calif. 91042

Filed Mar. 23, 1978, Ser. No. 889,299

Int. Cl.[2] B21D *1/12*

U.S. Cl. 72—447 **10 Claims**

1. In a pulling apparatus comprising a pair of spaced vertically extending members having oppositely outwardly facing surfaces, support means supporting said vertically extending members, guide means movably supported between said vertically extending members, pulling means supported on said support means, and flexible connecting means having one end connected to said pulling means extending through said guide means and having the other end adapted to be connected to a workpiece, primary anchor means including at least one flexible connecting means having one end secured to said pulling apparatus, a safety tie down assembly comprising attachment means secured to one of said outwardly facing surfaces of said vertically extending members intermediate the ends thereof, second flexible connecting means having one end secured to said attachment means, said primary anchor means being adapted to be secured to first anchor means and the other end



of said second flexible connecting means being adapted to be secured to second anchor means so as to restrain movement of said pulling apparatus along the line in which said pulling force is directed.

4,175,421

METER PROVERS

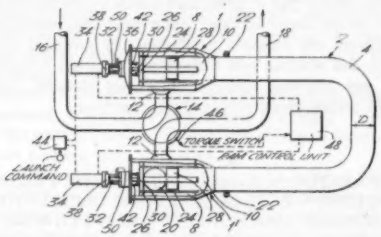
Kenneth J. Elderfield, Caythorpe, and Charles Griffiths, Wokingham, both of England, assignors to National Carbonising Company Limited, London, England

Filed Jun. 28, 1978, Ser. No. 919,853

Claims priority, application United Kingdom, Jul. 29, 1977, 32066/77

Int. Cl.[2] G01F *25/00*

U.S. Cl. 73—3 **7 Claims**



1. A meter prover including a u-shaped calibration conduit, a resilient plug that travels through said conduit, and at each end of the calibration conduit a plug delivery/receiving station in which the plug travels horizontally and which includes means for selectively retaining the plug in the station, each plug delivery/receiving station comprising a chamber having a first port at one end which is adapted to be connected to one end of the calibration conduit, and a second port adapted to be connected via valve means to a main pipe line, and a plug cage within the chamber arranged to extend horizontally from at least partly around said one end of said conduit to receive the plug as it emerges from said conduit end and guide it during limited horizontal travel away from said end to a rest position, and said retaining means comprising a sleeve having a cross-section corresponding to that of the conduit and mounted for horizontal movement to and fro in the gap between said conduit end and said plug in said rest position, the plug being an interference fit in the conduit and within the sleeve, actuator means being provided to move the cage and sleeve horizontally and rectilinearly between a first position in which the sleeve forms an extension of the conduit and a second position in which it engages around said plug in said rest position and there is then a space between said conduit and said sleeve, which space is in communication with said second port, whereby when the sleeve is in said first position fluid pressure admitted through said second port is able to force the plug through the sleeve in the conduit and when the sleeve and plug

are in said second position the fluid is able to bypass the plug and flow directly into the conduit.

4,175,422

GAS MONITORS

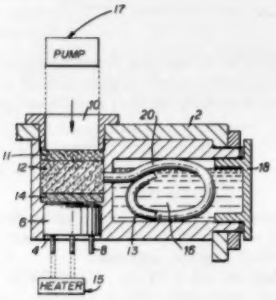
Leslie J. Owen, Porthcawl, Wales, assignor to British Steel Corporation, London, England

Filed Aug. 22, 1977, Ser. No. 826,649

Claims priority, application United Kingdom, Aug. 27, 1976, 35790/76

Int. Cl.[2] G01N *27/04*

U.S. Cl. 73—23 **13 Claims**



1. A gas sensor, having a sensitive element of semi-conductor type, the sensor being contained within an enclosure adapted to permit gas to come into contact with the element, wherein the enclosure incorporates a humidifier which maintains adjacent the element, a substantially constant relative humidity, and wherein said humidifier comprises a water absorbant pad disposed adjacent the sensor element, and arranged to communicate with a water reservoir.

4,175,423

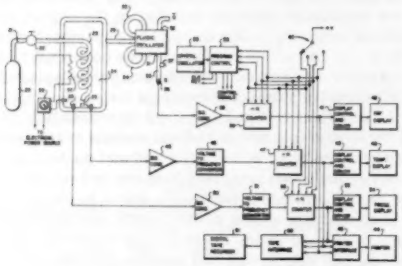
APPARATUS FOR DETERMINING THE PULSE REPETITION RATE OF A FLUIDIC OSCILLATOR THROUGH WHICH A TEST GAS IS FLOWING

Clarence Braun, and Joseph E. Zupanick, both of Richardson, Tex., assignors to Sun Oil Company (Delaware), Dallas, Tex.

Filed May 1, 1978, Ser. No. 901,884

Int. Cl.[2] G01N *9/32, 9/36*

U.S. Cl. 73—30 **6 Claims**



1. Apparatus for determining characteristics of a test gas comprising:

(A) a fluidic astable oscillator having a supply port and alternative state output ports;

(B) supply means for applying the test gas as the working fluid to said oscillator supply port, said supply means including:

(i) a surge tank coupled between a source of the test gas and said oscillator supply port; and

(ii) regulating means for regulating the pressure of the test gas applied to said oscillator supply port;

(C) a first pressure transducer for electrically sensing pressure pulses at one of said output ports;

(D) a second pressure transducer, said second pressure transducer being disposed in communication with the test gas in said surge tank;

(E) a first voltage-to-frequency converter connected to receive the output signal from said second pressure transducer such that the frequency of pulses issued by said first voltage-to-frequency coverter is responsive to the pressure of the test gas within said surge tank;

(F) timing means defining a predetermined time period;

(G) first counter means for accumulating pulses from said first pressure transducer during said predetermined time period such that, at the end of said predetermined time period, the accumulated count is representative of the pulse repetition rate of said fluidic astable oscillator;

(H) first record means for recording the pulse repetition rate at least temporarily;

(I) second counter means for accumulating pulses from said first voltage-to-frequency converter during said predetermined time period such that, at the end of said predetermined time period, the accumulated count is representative of the pressure in said surge tank; and

(J) second record means for recording the pressure of the test gas in said surge tank at leat temporarily.

4,175,424

DEVICE FOR HANDLING AND TESTING A CELL ADAPTED FOR SAMPLING A PRESSURIZED FLUID

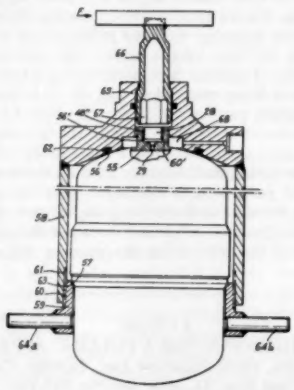
Jean-Pierre Bimond, and Flavien Lazarre, both of Pau, France, assignors to Societe Nationale Elf Aquitaine (Production), Paris, France

Filed Jun. 20, 1978, Ser. No. 917,285

Claims priority, application France, Jul. 27, 1977, 77 23017

Int. Cl.[2] G01M *3/32*

U.S. Cl. 73—49.2 **6 Claims**



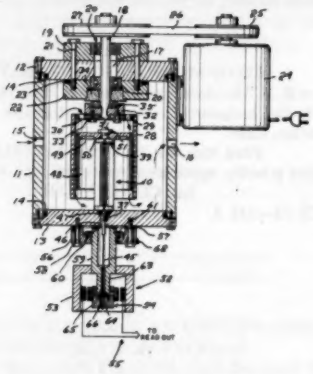
1. A device for handling a cell for sampling a pressurized fluid, comprising a closed receptacle having an internal wall delimiting an internal space equipped with means for fixing said sampling cell in a stable position, and an external wall into which opens, through an aperture, a connecting conduit connected to said internal space, said receptacle being provided with removable sealing means, said external receptacle wall comprising means for fixing said connecting conduit in such a manner that the latter is sealingly applied to the periphery of said aperture, said device further comprising removable testing means for testing said handling device, said testing means delimiting together with said external wall of said receptacle, in the zone surrounding the orifice of said connecting conduit opening into said internal space, a space which communicates

with pressure measuring means and which is removably connectable to a storing container containing said fluid, said removable testing means comprising means for controling said removable sealing means of said connecting conduit opening into said internal space of said receptacle.

4,175,425
VISCOMETER

David A. Brookfield, 168 Massapoag Ave., Sharon, Mass. 02067

Continuation-in-part of Ser. No. 786,015, Apr. 8, 1977, abandoned. This application Jun. 21, 1978, Ser. No. 917,470
Int. Cl.[2] G01N *11/14*
U.S. Cl. 73—59 **11 Claims**

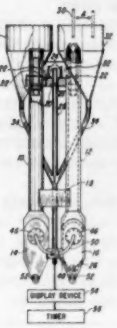


1. A viscometer including a chamber for fluid under pressure, first and second, concentric open ended cylindrical elements within the chamber, one element within the other with a clearance appropriate for the flow of liquid between them, means to rotate one element relative to the other and including a shaft member rotatably entrant of said chamber and connected axially to said one element, a chamber wall member, one of said members having a threaded port extending therethrough and coaxial with said elements and including a supporting portion having an axial passage, torque responsive means to support said inner element and to prevent contact thereof with the outer element, said means including a hub threaded in said port and having an axial passage extending therethrough, a part connected axially to said inner element, means connecting said part to said hub to enable said part to turn relative to said hub, said connecting means including a tube sealed axially to said part and to said hub and means arranged and disposed about said tube to provide lateral stability for said second element and the major percentage of the wanted torsional resistance to the turning thereof, a readout rod within said tube with one end anchored axially of and sealed to the second element and the other end extending freely through the tube and the passage of the supporting portion, the inside diameter of said tube such that the readout rod is close but a free fit therein and the outside diameter of the tube such that the tube provides a minor percentage of said torsional resistance but establishes a wall that is not deformable against the readout rod by the fluid pressure, and a readout device externally of the chamber and including a rotor fixed on the exposed end of the readout rod and a stator surrounding said rotor and fixed on said supporting portion, and a bearing held by the supporting portion, said readout rod extending through and rotatably held by and being unsupported between said bearing and said inner element and said bearing located close to the center of gravity of the rotor.

4,175,426
APPARATUS FOR MEASURING THE SEDIMENTATION CHARACTERISTICS OF PARTICULATE SOLIDS IN LIQUID

Frank R. Rosenblum, Ville St. Laurent, Canada, assignor to Noranda Mines Limited, Toronto, Canada

Filed Sep. 7, 1978, Ser. No. 940,321
Claims priority, application Canada, Apr. 24, 1978, 301784
Int. Cl.[2] G01N *15/04*
U.S. Cl. 73—61.4 **10 Claims**

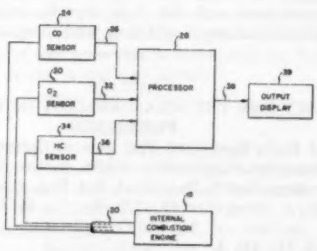


1. An apparatus for measuring the sedimentation characteristics of particulate solids comprising:
(a) two separate vertical housings adapted to be filled with a liquid less dense than the particulate solids to be measured and a bridge interconnecting the two vertical housings adjacent the top thereof for communicating the two housings and so maintain the same level of liquid in the two housings;
(b) means for introducing a sample of particulate solids to be measured in the top of one of said housings;
(c) two pressure sensors located, at the same level, one in each housing; and
(d) a differential pressure transducer connected to said pressure sensors for sensing the differential pressure caused by the sample introduced into one of the housings, said differential pressure transducer providing an output indicative of the weight percent of sample remaining in suspension above the pressure sensors as a function of time.

4,175,427
ENGINE FAULT ANALYSIS ON CATALYTIC CONVERTER EQUIPPED AUTOS

John D. Blanke, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Aug. 14, 1978, Ser. No. 933,246
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—118 **12 Claims**



12. An apparatus for isolating problems in a catalytic converter equipped internal combustion engine having an idle

state and an off idle state, said engine including a carburetor and exhaust, said apparatus comprising:

analyzer means for sensing carbon monoxide emissions, oxygen emissions and hydrocarbon emissions in said exhaust;

first means for producing a first response whenever said carburetor is out of balance as indicated by one of high carbon monoxide emissions while said engine is in said idle state or high hydrocarbon emissions with carbon monoxide emissions are greater than oxygen emissions while said engine is in said idle state;

second means for producing a second response whenever said carburetor needs to be overhauled as indicated by one of high carbon monoxide emissions while said engine is in said off idle state or high hydrocarbon emissions with carbon monoxide emissions greater than oxygen emissions while said engine is in said off idle state;

third means for producing a third response whenever said engine needs a tune up as indicated by high hydrocarbon emissions; and

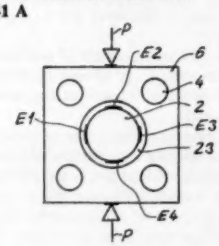
fourth means for producing a fourth response whenever the catalytic converter needs to be replaced as indicated by one of high carbon monoxide emissions with oxygen emissions greater than carbon monoxide emissions or high hydrocarbon emissions with oxygen emissions greater than carbon monoxide emissions.

4,175,428

CAPACITIVE DYNAMOMETER

Nils A. J. Eilersen, Gongehusvej 226, DK-2950 Vedbaek, Denmark

Filed Dec. 27, 1977, Ser. No. 864,798
Claims priority, application Denmark, Dec. 30, 1976, 5891/76
Int. Cl.[2] G01L *1/14*
U.S. Cl. 73—141 A **10 Claims**



1. A capacitive dynamometer comprising an elastic body for receiving a mechanical force to be measured, said body having a measuring cavity so shaped and located in said body that under the influence of the force to be measured the configuration of its inner wall is differently deformed along different axes, an electrode carrier forming a separate structural member being mounted in said measuring cavity, sets of capacitor electrodes, each including opposed electrode areas carried by said inner wall and said electrode carrier respectively, said sets of capacitor electrodes being so located in different positions along said inner wall that their capacity values depend on dimensional changes of said inner wall along different axes.

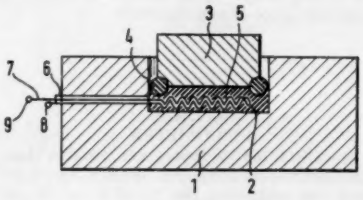
4,175,429

DEVICE FOR THE MEASUREMENT OF FORCES OR PRESSURES

Roland Keck, Dusseldorf, Fed. Rep. of Germany, assignor to Betriesbsforschungsinstitut VDEh Institut fur angewandte Forschung GmbH, Dusseldorf, Fed. Rep. of Germany

Filed Mar. 13, 1978, Ser. No. 886,043
Int. Cl.[2] G01L *5/00*
U.S. Cl. 73—141 A **9 Claims**

1. Arrangement for measuring forces and pressures with a high-pressure sensitivity metal wire according to its resistance value, bedded in a low shear force material such as flexible rubber material, compressed within a load-cell by means of a moving piston, characterised in that, a jacket thermo-element (6,7) is drawn complete with its shank(s) out of the load-cell



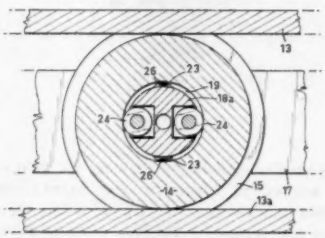
under internal pressure, the said metal wire (5) being connected by its ends to the relevant shanks.

4,175,430

LOAD MEASURING APPARATUS

William R. B. Morrison, and Richard F. Beale, both of Brisbane, Australia, assignors to Utah Development Company, San Francisco, Calif.

Filed Mar. 31, 1978, Ser. No. 892,402
Claims priority, application Australia, Apr. 4, 1977, PC9670
Int. Cl.[2] G01L *1/04*
U.S. Cl. 73—141 A **16 Claims**



9. In a rolling element having a cavity formed substantially centrally therewithin and comprising one of a plurality of rolling elements co-operating with oppositely arranged raceways to form a rolling element bearing assembly;

measuring apparatus for determining the load applied to said one rolling element, including sensing means adapted to be supported in said cavity to monitor a dimension of the cavity which varies with variations in the load applied to said bearing assembly and communication means operatively associated with said sensing means in such manner as to provide said monitored dimension in a form interpretable as the load applied to said one rolling element.

4,175,431

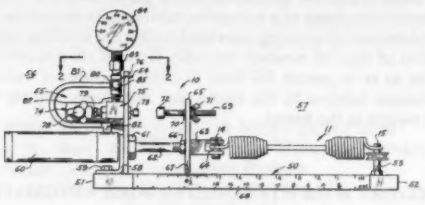
HEAVY DUTY SPRING TESTING APPARATUS AND METHOD

Henry R. DeTournay, 441 Mark Dr., Warson Woods, Mo. 63122

Filed Apr. 24, 1978, Ser. No. 899,411
Int. Cl.[2] G01N *3/10*
U.S. Cl. 73—161 **6 Claims**

6. A method for the comparative testing and mating of springs to provide matched spring sets having substantially equal size, length and tension characteristics conforming to prescribed specifications therefor, comprising the steps of orienting opposite ends of a spring at relatively fixed and movable locus points corresponding to the prescribed free length specification of the spring, adjusting the movable distance of the movable locus point to correspond to the prescribed tension length specification of the spring, applying a

pressure force from a pressure source substantially greater than the prescribed tension force of the spring to the movable locus point and substantially instantaneously moving such locus



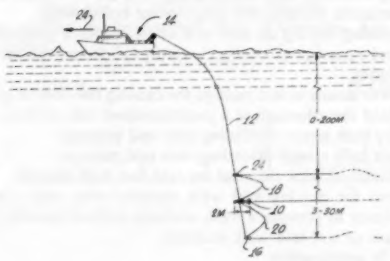
point the movable distance to tension the spring to its prescribed tension length, trapping the applied pressure force to hold the spring under tension and determining the tension force thereof, and releasing the applied pressure force.

4,175,432

APPARATUS FOR TOWING AN UNDERWATER INSTRUMENTATION PACKAGE

Carl H. Gibson, 9566 La Jolla Farms Rd., La Jolla, Calif. 92037

Filed Jul. 7, 1978, Ser. No. 922,774
Int. Cl.[2] G01W *1/00*
U.S. Cl. 73—170 A **9 Claims**



1. Apparatus for towing an underwater instrumentation fish, said apparatus comprising:

a main tow line secured to a towing vessel;

depressor means attached to said tow line to depress it below the surface of the water;

means for attaching the fish to said line to permitting movement of the fish along said line;

upper tether means secured to the fish and to an upper tether point on said line;

lower tether means secured to the fish and to a lower tether permit on said line; and

means integral with the fish, for resisting vertical heave forces;

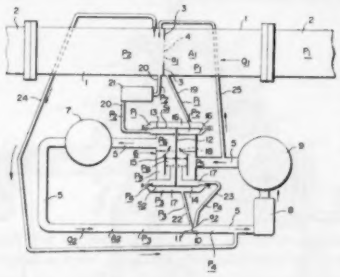
whereby drag forces on said upper and lower tether means are transmitted to the fish and tend to maintain it in an equilibrium position between said upper and lower tether points, and whereby rapid vertical oscillations of said tow line, caused by surface motion of the towing vessel, are heavily damped and not transmitted to the fish.

4,175,433

METHOD OF AND APPARATUS FOR THE MEASUREMENT OF THE RATE OF FLOW BY MEANS OF A BYPASS

Sotokazu Rikuta, 2-24-7 Koun-cho, Maebashi-shi, Gunma-ken, Japan (371)

Filed Dec. 19, 1977, Ser. No. 861,605
Claims priority, application Japan, Dec. 27, 1976, 51-158025
Int. Cl.[2] G01F *1/36*
U.S. Cl. 73—196 **6 Claims**



1. Apparatus for measuring the flow rate of a fluid in a main pipe comprising first restriction means in said main pipe for restricting a cross-sectional flow area of said main pipe, a loop circuit comprising pipe of relatively smaller dimension than the main pipe, pump means in said loop circuit for circulating fluid through said loop circuit, fluid flow measuring means for measuring the fluid flow in said loop circuit, second restriction means in said loop circuit for restricting the cross-sectional flow area in said loop circuit, proportional control means in said loop circuit, said proportional control means comprising valve means for regulating the fluid flow through said loop circuit, said proportional control means further comprising first and second pressure-receiving means operatively connected to said valve means, said valve means comprising a valve body having a valve port, a valve plug cooperable within said valve port, said valve plug having a first portion cooperable with said valve port to effect control of fluid through said valve port, said valve plug having a second portion which is hollow and disposed on the downstream side of said valve port, said first port, said first portion of said valve having an outer diameter equal to the inner diameter of said second hollow portion of said valve plug, a valve rod mounting said valve plug such that said valve rod and valve plug are movable as a unit, said valve rod being connected at the opposed ends thereof respectively to said first and second pressure receiving means, and first and second conduit means connecting said first and second pressure-receiving means respectively to said main pipe and said loop circuit upstream and downstream of the respective first and second restriction means, whereby the rate of flow in said loop circuit circulated in the loop circuit by the pump means is adjusted by said valve means to maintain a constant ratio between the pressure differential across said first and second pressure-receiving means respectively such that the rate of flow in said main pipe is determined by the fluid flow measuring means in said loop circuit.

4,175,434

COMPOUND METER ASSEMBLY

Allen C. Bradham, III, and Edward A. Seruga, both of Milwaukee, Wis., assignors to Badger Meter Inc., Milwaukee, Wis.

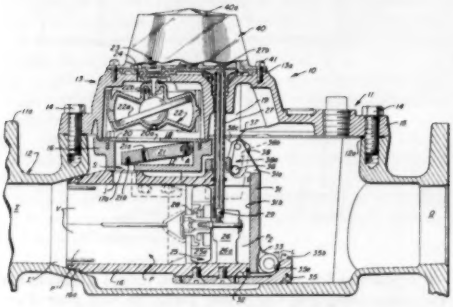
Division of Ser. No. 746,536, Dec. 1, 1976, Pat. No. 4,100,799.
This application Apr. 17, 1978, Ser. No. 897,189
Int. Cl.[2] G01F *7/00*
U.S. Cl. 73—197 **5 Claims**

1. A method of regulating and measuring fluid flow comprising the steps of:

directing fluid into an assembly having first and second flow

paths with inlets in fluid communication with one another and first and second valve means disposed in said first and second flow paths respectively such that said first flow path is at least partially open and said second flow path is closed by said second valve means at a low rate of flow of said fluid through said assembly, said second valve means being held closed with a predetermined locking force;

substantially precluding fluid flow through said first flow path by substantially closing said first valve means when the rate of fluid flow through said first flow path increases to a first predetermined rate thereby causing an abrupt



increase in the pressure differential acting on said closed second valve means;

utilizing only said increased pressure differential to overcome said predetermined locking force and open said second valve means, thereby opening said second flow path; and

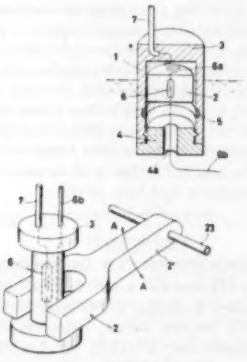
closing said second flow path by closing said second valve means only when the fluid pressure differential thereacross due to the rate of flow therethrough diminishes to a pressure differential substantially lower than the pressure differential thereacross at said first flow rate prior to closure of said first valve.

4,175,435

LIQUID LEVEL DETECTING DEVICE

Kunio Hara, Kawasaki, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed Aug. 10, 1978, Ser. No. 932,735
Int. Cl.[2] G01F *73/12*; H01H *36/00*
U.S. Cl. 73—313 **2 Claims**



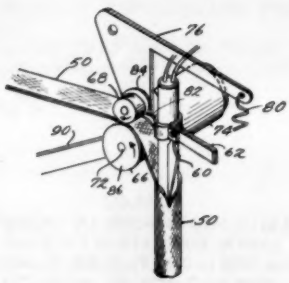
1. A liquid level detecting device, comprising a float provided with an inner hole internally incorporating permanent magnets and a barrel inserted through the inner hole of said float to guide the movement of the float and internally provided with a magnetically operatable lead switch, whereby the movement of the float which constantly follows the movement of a liquid surface selectively actuates the lead switch inside the barrel to permit detection of the liquid said float being formed in the shape of a horseshoe substantially to enclose the barrel and said float being provided with a rod member with a portion of the rod member rotatably fastened on a stationary means so as to permit the float to enjoy freedom of vertical movement relative to the barrel and selectively actuate the lead switch in the barrel.

4,175,436

WET/DRY BULB HYGROMETER WITH AUTOMATIC WICK FEED

William B. Crawford, Greensboro; Vernon T. Daniel, Oak Ridge, and Kenneth Y. Wang, Greensboro, all of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Aug. 28, 1978, Ser. No. 937,199
Int. Cl.[2] G01N *25/62*
U.S. Cl. 73—338.6 **24 Claims**



1. A wet/dry bulb hygrometer for monitoring and/or controlling humidity and temperature of a gaseous fluid having contaminants therein, said hygrometer comprising:

a housing having an inlet and an outlet for a gaseous fluid and a passage extending therethrough from the inlet to the outlet;

blower means in said passage for causing the flow of gaseous fluid therethrough at a predetermined rate of flow;

a dry bulb sensor extending into said passage;

a wet bulb sensor extending into said passage;

a source of wick material for said wet bulb sensor;

means for moving said wick material over said wet bulb sensor to provide a fresh wicking surface therefor; and

means to wet said wick material.

15. In combination:

an apparatus for treating materials with a gaseous fluid, said apparatus having a housing defining chamber for the materials; and

a wet/dry bulb hygrometer for monitoring the humidity and temperature of the gaseous fluid within the chamber, said hygrometer including a housing having a first portion mounted exteriorly of the chamber and having a second portion extending through a wall of the chamber, said hygrometer housing having a passage therethrough extending from an inlet in said second portion positioned within the chamber of said apparatus housing to an outlet in said second portion positioned within the chamber of said apparatus housing, a blower means in said passage in the first portion of said hygrometer housing for causing flow of gaseous fluid therethrough at a predetermined rate of flow, a dry bulb sensor extending through said first portion of said hygrometer housing into said passage, a rod-like wet bulb sensor extending through said first portion of said hygrometer housing into and having a free end in said passage, a source of wick material exterior of said hygrometer housing for said wet bulb sensor, means for

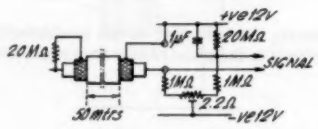
moving said wick material through said first portion of said hygrometer housing into said passage and over said wet bulb sensor and then out of said first portion of said hygrometer housing whereby a fresh wicking surface is provided for said wet bulb sensor, and means exterior of said hygrometer housing for wetting said wick material.

4,175,437

FIRE, TEMPERATURE OR HEAT DETECTOR

Dennis W. Burt, The Bungalow, Woodhouse La., Moulton Loosegate, Spalding, Lincolnshire, England

Filed Jun. 19, 1978, Ser. No. 916,533
Int. Cl.[2] G01K 7/24
U.S. Cl. 73—362 AR **7 Claims**



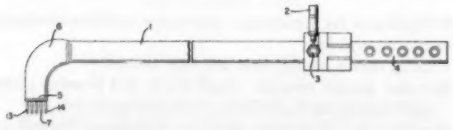
1. A fire, temperature or heat detection system, comprising a cable having at least two conductors separated by an electrically insulating material whose electrical resistance varies as a continuous function of temperature, and signal deriving means connected to the conductors of the cable for deriving an analog signal proportional to the electrical resistance of the insulating material and thus proportional to the cable temperature.

4,175,438

TEMPERATURE MEASURING PROBE

Josef Wenzl, Hebertshausen, and Günter Meikis, Karlsfeld, both of Fed. Rep. of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

Filed Apr. 17, 1978, Ser. No. 897,059
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1977, 2716884
Int. Cl.[2] G01K 1/12
U.S. Cl. 73—359 R **11 Claims**



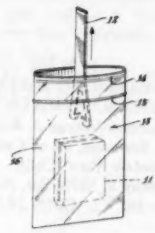
1. A temperature measuring probe which includes precious metal thermo-wires arranged in a substantially tubular-shaped probe body, the thermo-wires extending between temperature sensing means exposed to a flow of a hot medium and coupling means for connecting the probe to at least one of indicating means or control means, the coupling means and the temperature sensing means being arranged in parallel planes laterally offset from one another with at least a portion of the probe body extending in a plane of the coupling means, and a terminal member provided at one end of the probe body, a longitudinal axis of the terminal member extending at a right angle to a longitudinal axis of the probe body between the two parallel planes, the probe body being adapted to cool the thermo-wires, characterized in that an arc-shaped transition member is provided between the probe body and the terminal member, the transition member has a substantially round cross-sectional configuration, and in that the terminal member has a shallow rectangular cross-sectional configuration whereby a substantially laminar flow of the coolant through the probe body is achieved.

4,175,439

APPARATUS AND METHOD FOR COLLECTING, STORAGE AND TRANSPORTING LIQUID SAMPLES FOR DIAGNOSTIC EXAMINATION

Thomas L. Laker, 760-A Green Hill Rd., Madison, Conn. 06443

Filed May 13, 1977, Ser. No. 797,512
Int. Cl.[2] G01N 1/12
U.S. Cl. 73—425.4 R **3 Claims**



1. A device for collecting, storage, transporting and discharging a liquid sample collected from a liquid supply desired to be examined for medical, industrial or diagnostic purposes comprising

(a) a resilient absorbent member having sufficient capillary structure to absorb a portion of the liquid to be sampled when the absorbent member is placed in contact with the liquid supply or when the member is removed from the liquid supply to discharge the absorbed liquid upon the application of compressive pressure to the absorbent member;

(b) a sealable container for receiving, containing, storage and transporting the absorbent member holding the liquid;

(c) a handling stick for removably attaching the absorbent member thereto for inserting and removing the absorbent member relative to the liquid supply and the container respectively;

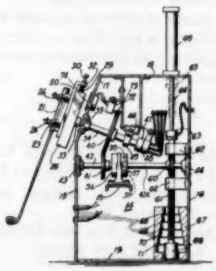
(d) the handling stick is provided at one end with a fork portion having tines for holding the absorbent member.

4,175,440

APPARATUS FOR DYNAMICALLY TESTING GOLF CLUBS

W. Jesse Booth, P.O. Box 1122, Cordele, Ga. 31015

Filed Aug. 10, 1978, Ser. No. 932,441
Int. Cl.[2] G01M 19/00; G01P 3/26
U.S. Cl. 73—432 SD **13 Claims**



1. An apparatus for dynamically testing golf clubs comprising a rotary inclined shaft having a head, a linear slide carried by said head on a linear movement axis across the head, a club shaft adjustable clasp means carried by the linear slide, the linear movement axis of the slide and the axis of the clasp means being substantially normal to the axis of the rotary inclined shaft and approximating the normal inclination of a

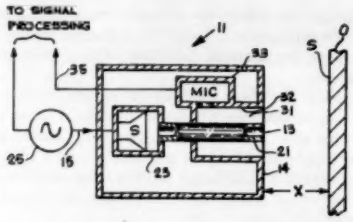
club shaft during actual usage by a golfer, an angular velocity indicator drivingly coupled with the rotary inclined shaft to indicate the angular velocity of a club being tested, means to power said rotary inclined shaft in one direction of rotation to move a club being tested on a backstroke, means to then move the club being tested on a forward power stroke, and fluid pressure responsive means operated by displacement of the linear slide due to centrifugal force acting on the club and slide during the forward power stroke and including a centrifugal force indicator.

4,175,441

GAUGE FOR MEASURING DISTANCE TO PLANAR SURFACES AND THICKNESSES OF PLANAR MEMBERS

Karel Urbanek, Atherton; George J. Kren, Los Altos, and William R. Wheeler, Saratoga, all of Calif., assignors to Tencor Instruments, Mountain View, Calif.

Filed May 8, 1978, Ser. No. 903,493
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—599 **23 Claims**



1. A gauge for measuring gap distance between a planar surface of an object and an orifice comprising,

acoustic means for modulating ambient pressure, said acoustic modulating means having an acoustic output means having a first orifice for emitting acoustic modulation toward the frontal surface of a non-vibrating planar object and establishing acoustic pressure in a gap defined between said acoustic output means and said frontal surface,

acoustic modulation detection means having an acoustic input means, including a second orifice for receiving acoustic modulation, operating at the same time as said acoustic output means and disposed proximate to said acoustic output means, said detection means for producing electrical signals representing the amplitude of detected acoustic modulation in said gap, said acoustic output means and said acoustic input means both facing said frontal surface in an acoustic emission, reflection and detection relationship therewith, and

signal processing means connected to receive said electrical signals, for producing a gap distance measurement signal from the amplitude of said electrical signals in accord with a known relation.

4,175,442

METHOD AND APPARATUS FOR THE ULTRASONIC DETECTION OF FLAWS IN HOT METALLIC OBJECTS

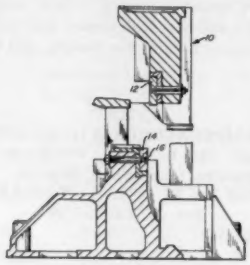
Hazle B. Terry, Birmingham, Ala., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Jan. 5, 1978, Ser. No. 867,059
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—627 **2 Claims**

1. A method of determining the optimum crop point of a hot rolled primary mill product, said method comprising:

(1) positioning said mill product with one end thereof between the upper and lower blades of a crop shear, one blade of said crop shear having acoustically coupled therewith an ultrasonic transducer connected to an indicating device,

(2) contacting respectively, the upper and lower surfaces of said product end with the upper and lower blades of the shear and with sufficient pressure to form an acoustic couple between said transducer and said product, and



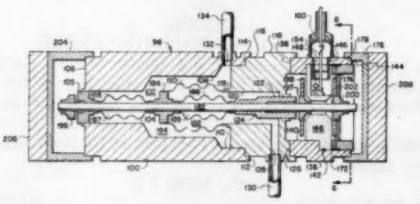
(3) monitoring the indicating device to determine if a primary pipe is in the plane of said crop shear blades.

4,175,443

WET-WET DIFFERENTIAL PRESSURE TRANSDUCER

John C. Schneider; S. Eugene Hanson, and Bruce W. DuVall, all of Colorado Springs, Colo., assignors to Kaman Sciences Corporation, Colorado Springs, Colo.

Filed May 25, 1978, Ser. No. 909,666
Int. Cl.[2] G01L *9/10*
U.S. Cl. 73—722 **12 Claims**



1. Apparatus for measuring a difference between sources of pressure, comprising:

housing means having ends and side walls;

first and second pressure chambers in said housing means each connected to different sources of pressure;

third and fourth pressure chambers positioned respectively within the first and second chambers and provided with fluid tight sealing means sealing same against communication with said first or second pressure chambers, with the ambient atmosphere or with each other;

a first longitudinally movable flexible wall positioned between the first and second chambers;

a second longitudinally movable flexible wall positioned between the first and third chambers;

a third longitudinally movable flexible wall positioned between the second and fourth chambers;

a movable common wall between said first and second chambers;

said first flexible wall having one end connected to the housing means and the other end connected to the common movable wall within the housing;

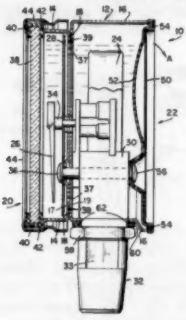
said second and third flexible walls each having one end connected to the common movable wall and the other end connected to the housing; and

means to measure the displacement of the common wall as a function of the differential pressure within the first and second chambers.

4,175,444
GAUGE ASSEMBLY

Philip W. Harland, Perkasie, Pa., assignor to Ametek, Inc., Sellersville, Pa.

Filed Aug. 10, 1978, Ser. No. 932,517
Int. Cl.[2] G01L *19/06*
U.S. Cl. 73—738 **6 Claims**

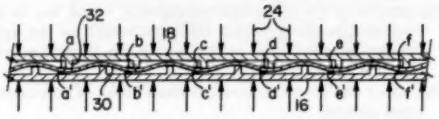


1. A gauge assembly comprising a casing adapted to be liquid filled during operation of said assembly, said casing including front and rear cup members joined together to form a partition wall therein, front and rear covers for sealingly enclosing said front and rear cup members at their opened ends, respectively, said rear cover being constructed and arranged to separate from said rear cup member when the pressure of said liquid within said casing exceeds a given level, indicator means disposed within said front cup member for indicating a physical condition to be measured, and condition responsive means disposed within said rear cup member and coupled to actuate said indicator means in corresponding relationship to said physical condition.

4,175,445
PRESSURE SENSING APPARATUS

John S. Templeton, III, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Sep. 5, 1978, Ser. No. 939,580
Int. Cl.[2] G01L *11/00*
U.S. Cl. 73—768 **15 Claims**



1. A pressure sensing apparatus for measuring pressure forces in an embedding medium comprising:

a housing whose thickness is substantially less than its width having first and second plates which are substantially parallel to one another and which are attached at their peripheral edges and are also responsive to external pressure forces;

a thin, flexible member supported within said housing in spaced relationship between said first and second plates;

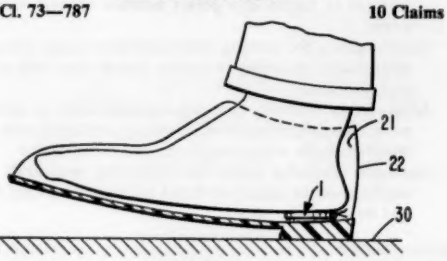
a plurality of standoffs whose longitudinal axes are substantially parallel to one another and substantially parallel to one another and substantially normal to the direction of external pressure wherein said standoffs support said member in spaced relationship to permit reverse curvature bending of said member when said first and second plates are exposed to said external pressure defining tension and compression zones on the surfaces of said member such that the stiffness of the pressure sensing apparatus is substantially similar to the average anticipated stiffness of the embedding medium yet said apparatus is insensitive to variations in the stiffness of the embedding medium; and

means for measuring the deformation of said member resulting from the reverse curvature bending due to said external pressure forces.

4,175,446
STEP COUNTING DEVICE AND METHOD

Roy D. Crowninshield, and Andrew J. Branch, both of Iowa City, Iowa, assignors to The University of Iowa Research Foundation, Iowa City, Iowa

Filed Apr. 26, 1978, Ser. No. 900,216
Int. Cl.[2] G01C *22/00*
U.S. Cl. 73—787 **10 Claims**



1. Apparatus for counting the steps taken by a subject wearing said device comprising:

(a) a shoe,

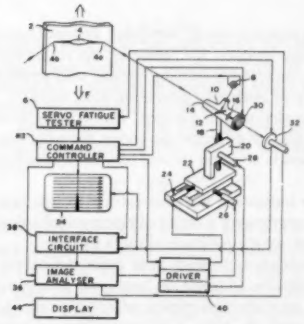
(b) a support member mounted on said shoe, at a location which is subjected to compressive forces while walking,

(c) a fatigue life gauge bonded to an area of the support member which is normally relaxed and is strained in response to steps taken on the device by the subject, whereby said fatigue life gauge is strained and the number of steps taken by said subject may be ascertained by measuring the properties of said fatigue life gauge.

4,175,447
APPARATUS FOR DETECTING CRACK LENGTH OF A TEST PIECE IN A FATIGUE TEST

Toshihiko Fukuhara, Hatano, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Oct. 25, 1978, Ser. No. 954,600
Claims priority, application Japan, Oct. 26, 1977, 52-127640
Int. Cl.[2] G01N *3/32*
U.S. Cl. 73—799 **10 Claims**



1. An apparatus for detecting crack length of a test piece in a fatigue test:

comprising a light source;

irradiation means for irradiating the crack formed in the test piece by reflecting a light beam from said light source;

camera tube means for displaying an image of the crack thereon by means of reflected light beam from said test piece, said reflected light beam being adapted to pass through said irradiation means before reaching said camera tube means;

memory means for memorizing said image for an extended period;

monitor means connected to said memory means for monitoring said image of the crack;

image analyser means connected to said memory means for analyzing said image of the crack from signals supplied from said memory means, said image analyser means being also adapted to memorize data concerning positions of one of the leading ends of said crack when said leading end is adjusted to locate at a preset position on said monitor means;

transfer means for moving said irradiation means three dimensionally according to output signals from said image analyser means;

fatigue tester means for applying repeating loads on said test piece, said fatigue tester means being connected with said image analyser means and controlled thereby; and

command controller means for controlling an overall time sequence of the apparatus based on load signals fed from said fatigue tester means;

4,175,448

ELECTROMECHANICAL SWITCHING SYSTEM

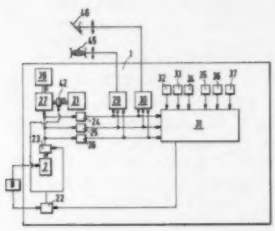
Peter Loew, Wallau, and Wolfgang Hummel, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 21, 1977, Ser. No. 844,468

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1976, 2647787

Int. Cl.[2] **F16H** *3/08, 5/06;* **B60K** *20/10;* **B60L** *5/10*

U.S. Cl. 74—365 **8 Claims**



1. An electromechanical switching system comprising:

a multi-stage gearbox for changing the rotational speed of a drum connected to driving means, said gearbox having a plurality of manually selectable gear ratios;

a lever coupled to said gearbox, which lever is movable into a plurality of different positions for selecting said gear ratios and is coupled to said electromechanical switching system;

means for indicating the gear ratio selected, said indicating means comprising a series of electromechanical switching elements which produce control signals;

means responsive to said gear ratio indicating means for automatically locating at least one component such as optical reproduction means, as, for example, an objective, mirror and the like, said component connected to said switching system in the position corresponding to the selected gear ratio, said locating means comprising motor means connected to said component for positioning said component in response to said control signals; and

means for locking said gearbox in the selected one of said gear ratios.

4,175,449

TILT CAB STEERING COLUMN

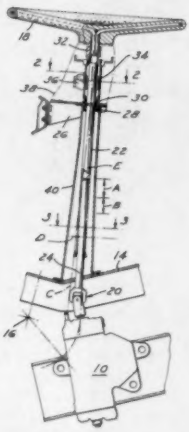
Walter Manning, Little Baddow, and Terry G. Bradley, Chelmsford, both of England, assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 2, 1977, Ser. No. 847,985

Claims priority, application United Kingdom, Feb. 9, 1977, 5272/77; Feb. 9, 1977, 5273/77

Int. Cl.[2] **B62D** *1/18*

U.S. Cl. 74—492 **7 Claims**



1. A steering column assembly comprising an elongate upper column member for connecting with a steering wheel and an elongate lower column member for connection with a steering box,

the steering wheel being secured directly to the upper column member,

the lower column member being telescopically received within the upper column member for sliding movement between an operative and an inoperative position,

the upper column member having a first length of its internal surface adjacent the received end of the lower column member, when in said operative position, dimensioned to fit closely on the inner member and a second length extending from its first length toward its receiving end diverging to provide a clearance,

the portion of the lower column member which lies, in said operative position, within said first length of the upper column member being coated with a low friction polytetrafluoroethylene material,

the upper and lower column members being of non-circular cross section,

the upper column member comprises a tube and the lower column member a rod,

and bearing means supporting the members for rotation about their longitudinal axis and for limited tilting of said axis.

4,175,450

MOTION TRANSMITTING REMOTE CONTROL ASSEMBLY

William G. Bennett, Troy, Mich., assignor to Teleflex Incorporated, Limerick, Pa.

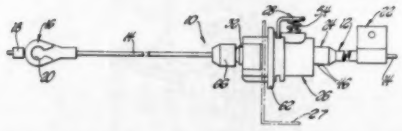
Filed Feb. 21, 1978, Ser. No. 879,455

Int. Cl.[2] **F16C** *1/10*

U.S. Cl. 74—501 P **12 Claims**

1. A motion transmitting remote control assembly comprising; a conduit, a core element movably supported by said conduit with the ends thereof extending from the ends of said conduit, a fitting adjacent a first end of said conduit for attaching said conduit to a support structure, adjustment means

attached to said conduit adjacent the second end thereof, support means adapted for attachment to a support structure and movably supporting said adjustment means, locking means supported by said support means for movement between engaged and disengaged positions for controlling relative movement between said adjustment means and said support means in a direction longitudinally of said conduit when in said engaged position, said adjustment means and said support means including retaining means for preventing removal of said adjustment



means for said support means, said support means including a passageway extending therethrough, said adjustment means being slidably supported in said passageway, said retaining means including at least one flange extending into said passageway from said support means and first and second spaced abutments extending radially from said adjustment means and disposed on opposite sides of said flange for limiting movement of said adjustment means in said passageway and preventing said removal of said adjustment means from said support means.

4,175,451

GUIDANCE SYSTEM USING SPRING-STORED ENERGY

Frederick D. Ward, Quebec, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Quebec, Canada

Filed Nov. 22, 1977, Ser. No. 853,857

Claims priority, application Canada, Dec. 17, 1976, 268087

Int. Cl.[2] F16H *1/00*

U.S. Cl. 74—661 **27 Claims**

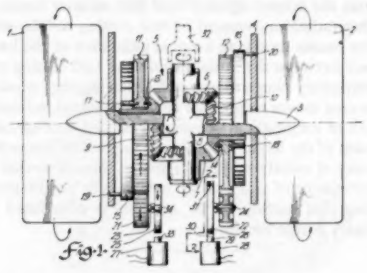


Fig. 1.

1. A device for controlling the angular position of a vane comprising:

(a) a first shaft,

(b) a second shaft normal to and solid with said first shaft;

(c) a vane secured adjacent one end of said first shaft;

(d) a differential gear arrangement having a pair of gears rotatably mounted on said first shaft and at least one gear meshing with said pair of gears and rotatably mounted on said second shaft;

(e) drive means drivingly connected to one gear of said pair of gears;

(f) motor means drivingly connected to said drive means to drive the same;

(g) means selectively operable to effect incremental movement of the drive means; and

(h) brake means associated with the second gear of said pair of gears to arrest the same, whereby incremental movement of said drive means causes a change in the angular position of said vane.

4,175,452

MACHINE FOR THE MECHANICAL WORKING OF BAND SAWS

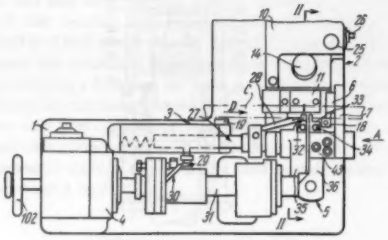
Vladimir V. Idel, Zakarpatskaya oblast, U.S.S.R., assignor to Mukachevsky Stankostroitelny Zavod Imeni S.M. Kirova, U.S.S.R.

Filed Mar. 2, 1977, Ser. No. 773,752

Claims priority, application U.S.S.R., Mar. 30, 1976, 2333522; Mar. 30, 1976, 2333523

Int. Cl.[2] B23D *63/00*

U.S. Cl. 76—25 R **4 Claims**



1. Apparatus for setting teeth of band saw blades and cutting thereof, means for advancing a band saw blade longitudinally, a tooth-setting device comprising two pivotally mounted arms having tooth-setting tools thereon, pivot means pivotally mounting said two arms, means for actuating said arms to effect setting of the teeth on said band saw blade, a pair of knives disposed downstream of said tooth setting device for cutting said blade after the teeth thereof have been set, means mounting one of said knives stationary, said pivot means pivotally mounting the other knife of said two knives, means to render said other knife effective when a given number of teeth on a corresponding length of said blade have been set, actuating means on one of said arms for actuating said other knife when rendered effective to cooperate with the stationary knife to effect cutting of said band saw blade.

4,175,453

DEVICE FOR TENSIONING SEVERAL SCREW BOLTS

Gerhard Exner, and Volfango Festinori, both of Berlin, Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Mar. 28, 1978, Ser. No. 890,920

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1977, 2718602

Int. Cl.[2] E21B *19/00*

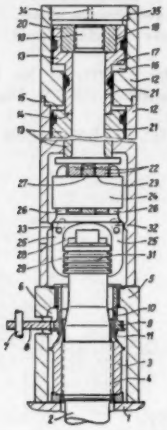
U.S. Cl. 81—57.38 **4 Claims**

1. In a device for tensioning a screw bolt of a nut and screw bolt combination, the device comprising: a support ring having recesses for receiving said screw bolt and nut; a turning unit fastened to said ring for rotating said nut; a lifting cylinder arranged on said support ring and having a piston, the improvement comprising means coupled to the piston for engaging the screw bolt in a positive locking manner in response to only a tensioning movement of the piston, said means including:

(a) a first member connected to the piston for movement therewith in the direction of tensioning;

(b) a second member hinged to said first member;

(c) an extending portion of said screw bolt having thereon an engagement surface; and



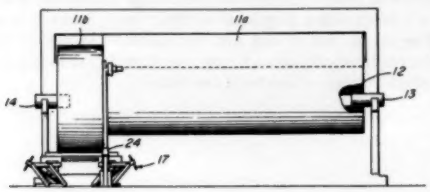
(d) guide surfaces for pressing said second member against said engagement surface of said screw bolt in a positively-engaging and self-locking manner.

4,175,454

APPARATUS FOR RECOVERING PAPER IN USABLE FORM FROM A DAMAGED ROLL

David J. Goldstein, 6 Oakland St., Fall River, Mass. 02720

Filed Aug. 8, 1977, Ser. No. 822,406
Int. Cl.[2] B23B *5/14*
U.S. Cl. 82—86 **4 Claims**



1. An apparatus for recovering in usable form the undamaged portion of a damaged roll of paper comprising in combination:

(a) unwinding means (**15**) for supporting a damaged roll of paper on its axial core so as to permit unreeling forwardly;

(b) a support means (**20**) spaced rearwardly of said unwinding means (**15**) and positionable along said roll axially thereof;

(c) a rigid arm (**18**) pivotally mounted on said support means (**20**);

(d) cutting means (**19**) attached to said rigid arm (**18**) and provided with a motor means (**53**);

(e) piston means (**23**) for selectively raising and lowering said rigid arm (**18**) for positioning said cutting means (**19**) adjacent the point at which the paper is unreeled from the undamaged portion of said roll; and,

(f) roller means (**17**) having rollers (**30**) and means (**37**) to adjust said rollers vertically at a fixed adjustable position and means (**60**) permitting adjustable positioning of said rollers axially along said roll to support the damaged portion of the roll from beneath while the undamaged portion is unreeled to stabilize said roll during unreeling;

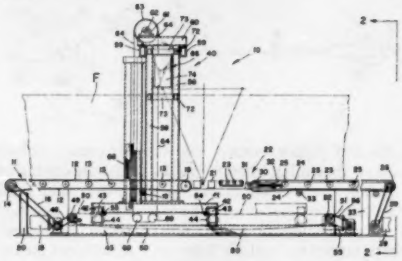
said apparatus being so arranged so that said cutting means cuts said roll of said paper as it is unreeled to the selected depth so that what is unreeled is the undamaged portion, the damaged portion remaining on the unwinding means (**15**).

4,175,455

TRAVELLING CUT-OFF SAW

James Genis, Clinton, and William T. Mars, Cuyahoga Falls, both of Ohio, assignors to McNeil Corporation, Akron, Ohio

Filed Mar. 22, 1978, Ser. No. 888,829
Int. Cl.[2] B28B *11/14*
U.S. Cl. 83—110 **6 Claims**



1. Apparatus for severing a continuous material into sections comprising, an infeed conveyor carrying the continuous material in a longitudinal direction, stationary cutting platen means at the end of said infeed conveyor, cutting means above the material and movable longitudinally and vertically to sever the material into sections, outfeed conveyor means adjacent said platen means to carry away the severed sections, sensor means providing an output signal indicative of the speed of said infeed conveyor, first counter means receiving the output signal of said sensor means and providing an output signal when the material carried by said infeed conveyor has travelled a predetermined distance, said predetermined distance being selected according to the desired length of the severed sections of material, the output signal of said first counter means initiating the longitudinal movement of said cutting means, and second counter means receiving a signal indicative of the longitudinal distance between the initial position of said cutting means and said stationary platen means and receiving the output signal of said sensor means to provide an output signal indicative of the amount of longitudinal movement of said cutting means from the point of the initial longitudinal movement thereof and until the point of initial vertical movement thereof so that the vertical movement of said cutting means may be initiated thereby assuring that cutting of the material is completed over said stationary platen means.

4,175,456

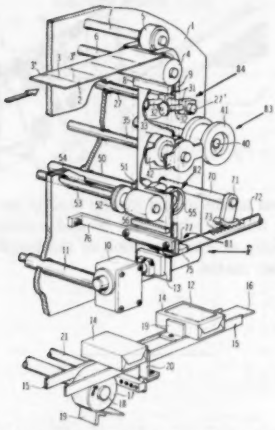
FEEDING AND CUTTING DEVICE FOR SHEET MATERIAL

Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Bologna, Italy

Filed Jan. 16, 1978, Ser. No. 869,522
Claims priority, application Italy, Jul. 27, 1977, 3510 A/77
Int. Cl.[2] B26D *5/22*
U.S. Cl. 83—176 **3 Claims**

1. A feeding and cutting device for sheet material in the form of a continuous web to be cut into pieces at substantially equispaced transverse slits provided centrally through the web, the device comprising a web path for said web; cutting means associated with said web path and arranged transversely thereto, said cutting means comprising a cutting movable on a cutting plane through said web path; web feeding means to feed the web to said cutting means in a step-by-step manner; a fixed registering member arranged on said cutting plane on one side of the web path; reciprocating pushing means arranged on the other side of the web path and operable towards the latter to depress the leading edge of one said slit arranged down-

stream from said cutting plane; and return means to engage the web upstream from said cutting plane and draw the web backwards until said depressed leading edge abuts said registering member at said cutting plane, said return means comprise

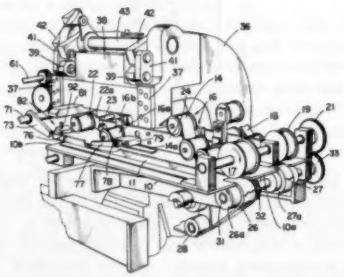


sucker means reciprocating along said web path while remaining substantially stationary in a direction transversely of the web path and substantially continuously engaging said web at a position upstream from said cutting plane and at least during their movement away from said cutting plane.

4,175,457
BINDING HOLE PUNCH APPARATUS

Morris L. Jacobs, 524 W. Somerset Dr., Indianapolis, Ind. 46260, and Hiram J. Dunagan, Moral Rd., Fairland, Ind. 46126

Filed Apr. 7, 1978, Ser. No. 894,539
Int. Cl.[2] B26D 5/22
U.S. Cl. 83—230 **1 Claim**

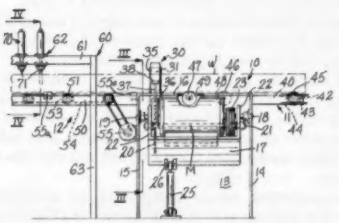


1. An apparatus for punching spaced binding holes in discrete stacks of bound pages arriving at relatively high speed from an automatic stitcher-binder or the like, said apparatus comprising a table supported in a generally horizontal plane adapted to receive the bound page stacks at one end margin of the table and to discharge the stacks at its opposite end margin, a powered conveyor belt moved parallel to the surface of said table for moving the bound page stacks in end-to-end relation between said receiving and discharge margins of the table, a unitary die and punch assembly removably mounted adjacent said discharge margin of said table and adapted to receive one-by-one between its die and punch components the bound page stacks moving from said table, a punch bar supported for rectilinear vertical reciprocation between a lowered position in which it actuates said die and punch assembly to punch spaced holes in the bound page stack accommodated in the punch and die assembly and a raised position deactuating said die and punch assembly to permit the punched stack to move off said table and completely through said punch and die assembly, power means for moving said punch bar between its said positions, a stop member mounted for arcuate movement on a first shaft (**71**) for defining when in operative position the position of the leading margin of the accommodated page stack as said die and punch assembly is actuated, a pinch roller mounted for pivotal movement on a second shaft (**23**) for maintaining said accommodated page stack in driving engagement with said conveyor belt, and cam means operated in synchronism with the motion of said punch bar for incrementally rotating said first shaft and said stop member out of operative position as said punch bar ascends and for incrementally rotating said second shaft and said pinch roller out of belt engaging position as said punch bar descends, said cam means comprising a third shaft (**66**) carrying a first cam (**67**) and a second cam (**68**) each independently mounted on said third shaft in spaced relation to each other, said first cam cooperating with said first shaft and said second cam cooperating with said second shaft to provide said incremental motion of the shafts, and power means for rotating said third shaft.

4,175,458
CUT-OFF SAW

Alfonso A. Paris, Jr., and Douglas W. Muscanell, both of South Hill, Va., assignors to New England Log Homes, Inc., Hamden, Conn.

Filed Apr. 13, 1978, Ser. No. 895,925
Int. Cl.[2] B27B 5/18, 27/00
U.S. Cl. 83—268 **5 Claims**



1. A cut-off saw assembly for cutting longitudinally grooved logs to selected predetermined lengths comprising a saw and clamp station, a feed table, a delivery table, and a stop assembly, the saw and clamp station having

a power driven saw,

a vertically movable support for the saw,

means for moving the saw upward across the path of a workpiece,

a vertically movable clamp, and

means for moving the clamp into engagement with the top of a workpiece,

the feed table having a plurality of rolls and guide means engageable with the longitudinal groove in a workpiece,

the delivery table having a plurality of rolls and guide means engageable with the longitudinal groove in a workpiece, and

the stop assembly being associated with the delivery table and having means for supporting stop devices at selected points above the path of the workpiece and along the length of the delivery table, a plurality of stop devices mounted on said

supporting means and means for actuating selectively any one stop device.

4,175,459

FLYING SHEARS FOR SEVERING A RUNNING WIRE

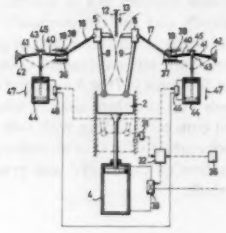
Günter Ditges, Cologne; Wilhelm Mörs, and Rolf Gärtner, both of Weiden, all of Fed. Rep. of Germany, assignors to Meyer, Roth & Pastor Maschinenfabrik GmbH, Cologne, Fed. Rep. of Germany

Filed Apr. 18, 1978, Ser. No. 897,649

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1977, 2732770

Int. Cl.[2] B23D *25/08*

U.S. Cl. 83—315 11 Claims



1. A cutting apparatus for severing a wire continuously advanced through the apparatus along a wire path in a feeding direction parallel to the wire axis, comprising:

(a) a machine frame;

(b) a carriage supported for displacement parallel to said feeding direction;

(c) two cutting members;

(d) means connecting said cutting members with said carriage;

(e) a support arm articulated to at least one of said cutting members;

(f) displaceable anchor means comprising a slide;

(g) a support joint arranged on said support arm at a distance from the associated cutting member and articulating said support arm to said displaceable anchor means;

(h) drive means for moving said carriage in and opposite said feeding direction to cause, with the cooperation of said anchor means and said support arm, a motion of the cutting member in an arcuate path towards and, subsequent to severing, away from the wire path and the other cutting member;

(i) a force-exerting means comprising an additional drive means for shifting said anchor means to effect a displacement of said support joint and said support arm for affecting the course of the arcuate path of said cutting member;

(j) means for guiding said slide in said machine frame transversely to said feeding direction; and

(k) a toggle having first and second toggle links connected to one another by a toggle joint; said first toggle link being articulated to said slide and said additional drive means being connected to said toggle joint.

4,175,460

FELT, BELT, AND FABRIC TRIMMER

John D. McPhail, 2125 E. 38th St., Savannah, Ga. 31404

Filed Mar. 27, 1978, Ser. No. 890,303

Int. Cl.[2] B26D *3/12*

U.S. Cl. 83—856 7 Claims

1. Trimmer apparatus for trimming the edges of an endless belt, said apparatus comprising:

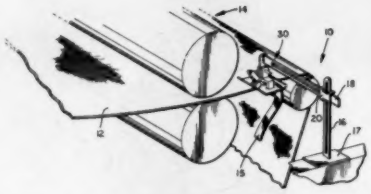
first bracket bar means for attachment of said trimmer apparatus to a machine;

second bracket bar means for attachment to said first bracket bar means;

foot means removably attached to said second bracket bar means and having a region which selectably contacts a belt to be trimmed;

knife means removably attached to said foot means in operative relation to cut a belt which is contacting said region and moving relative to said region; and

means for maintaining the angular relationships of said first



bracket bar means to said second bracket bar means while allowing slidable adjustment of said second bracket bar means along at least a portion of the length of said first bracket bar means.

4,175,461

ELECTROMAGNETIC PICKUP DEVICE

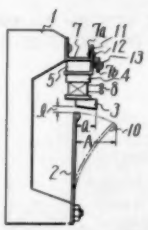
Yukio Nagata; Eiji Satoh, and Keinosuke Tsuchida, all of Kawasaki, Japan, assignors to Nippon Columbia Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 23, 1977, Ser. No. 826,991

Claims priority, application Japan, Aug. 25, 1976, 51-101387; Apr. 30, 1977, 52-50236

Int. Cl.[2] G10H *3/08*

U.S. Cl. 84—1.15 5 Claims

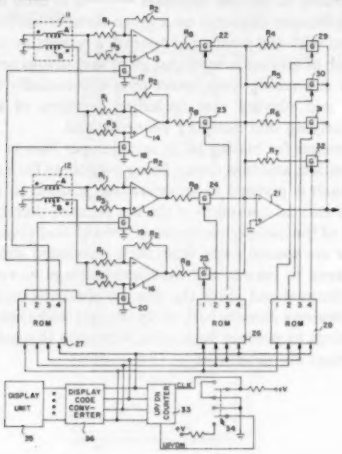


1. In an electromagnetic pickup device for transducing a mechanical vibration of a vibratory reed into an electric signal, said electromagnetic pickup device comprising, a vibratory reed having a longitudinal axis one end portion of which is fixed to a supporting member and the remaining portion of which is free to vibrate in a predetermined transverse direction, a magnetic means mounted on said supporting member in an alignment relationship to a longitudinal axis of said vibratory reed at a rest position thereof, said magnetic means including a pole piece member, said pole piece member including a surface having an opposing face portion which extends transversely from said rest position to one side of said predetermined transverse direction of a vibration of said reed for a distance such that a substantially constant gap is formed between said reed and said magnetic means so as to maintain constant low magnetic reluctance for a period no longer than one-fourth ($\frac{1}{4}$) cycle of said vibration during vibration from said rest position of said reed, said magnetic means has a magnetizing direction parallel to the longitudinal axis of said reed, and a coil means associated with said magnetic means to generate an electrical signal in response to said vibration of said reed.

4,175,462
SYSTEM FOR SELECTION AND PHASE CONTROL OF HUMBUCKING COILS IN GUITAR PICKUPS

Jonathan C. Simon, 1451 26th St., Santa Monica, Calif. 90404

Filed Jun. 17, 1977, Ser. No. 807,368
Int. Cl.[2] G10H *3/00*
U.S. Cl. 84—1.16 **8 Claims**



1. A system for the selection and phase control of humbucking coils in a plurality of electromagnetic guitar pickups to permit the musician to easily select different sounds comprising

a plurality of selection gates, each of which may be selected by a digital signal, one for each coil,

a plurality of means, one for each coil, for buffering and selectively inverting or not inverting a coil signal, each of which may be selected by a digital signal,

a summing means having a plurality of input terminals for receiving signals to be summed and amplified, and having a plurality of distinct gain factors each of which may be selected by a digital signal,

said plurality of guitar pickups each having a pair of humbucking coils, each coil having one end connected directly to circuit ground and the other end coupled to said summing means by one of said selection gates and one of said selectively inverting and buffering means in cascade,

digital memory means for storing different combinations of digital signals to select particular ones of said gates for the pickup coils to be used, to select particular ones of said selectively inverting means for selecting the phase of the coils selected, and to select said selectable gain factors of said summing means for the output level of the selected coils combined, and

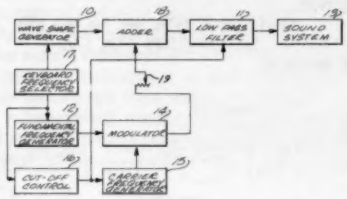
means for addressing said digital storage means to read out one of said different combinations of digital signals.

4,175,463
RESONATOR FOR A MUSICAL TONE SYNTHESIZER

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co. Ltd., Hamamatsu, Japan

Filed Dec. 5, 1977, Ser. No. 857,436
Int. Cl.[2] G10H *5/10*
U.S. Cl. 84—1.19 **18 Claims**

1. A tone synthesizer having a resonance characteristic comprising means generating an audio tone signal having a plurality of harmonics, means generating a sinusoid signal having a frequency higher than the fundamental of the audio tone, means including a modulation signal source generating a signal having the frequency of the fundamental of the audio tone signal, means amplitude modulating the sinusoid signal,

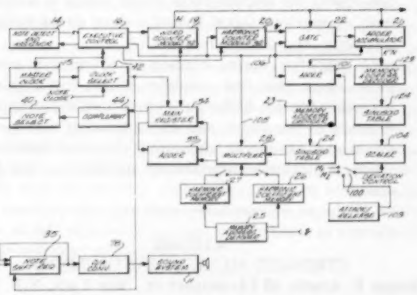


and means adding the amplitude modulated sinusoid signal to the audio tone signal.

4,175,464
MUSICAL TONE GENERATOR WITH TIME VARIANT OVERTONES

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co. Ltd., Hamamatsu, Japan

Filed Jan. 3, 1978, Ser. No. 866,336
Int. Cl.[2] G10H *1/04, 1/06*
U.S. Cl. 84—1.24 **20 Claims**



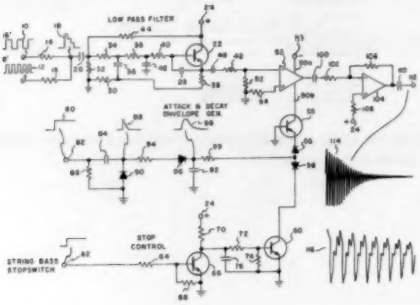
1. A musical tone generator for generating a voltage having a waveform corresponding to musical sounds having overtones that can be varied with time, comprising: a first addressable storage means for storing in predetermined addressable sequence a plurality of orthogonal function values, address generating means generating a series of numerical addresses corresponding to said predetermined addressable sequence, means synchronized with said address generating means for generating a sequence of numbers, a different number for each numerical address from said address generating means, the succession of numbers alternately increasing and then decreasing in value in a periodic manner, scaler means for scaling said sequence of numbers by a predetermined scale factor, means including an adder connected to the output of the means generating addresses and the scaler means for adding the scaled numbers to the numerical addresses for addressing said storage means in response to each sequential address modified by a scaled number and reading out the respective orthogonal function values, and means for converting each of said orthogonal function values to a voltage which varies in amplitude in proportion to changes in said orthogonal function values as they are read out of the storage means in response to the addresses from the adder.

4,175,465

CIRCUIT FOR SIMULATING STRING BASS SOUND

George F. Schmoll, III, Dolton, Ill., assignor to CBS Inc., New York, N.Y.

Filed May 1, 1978, Ser. No. 901,950
Int. Cl.[2] G10H *1/06, 5/12*
U.S. Cl. 84—1.26 6 Claims



1. In an electronic organ including tone generating means for producing a plurality of square wave signals having octavely related frequencies, apparatus for generating an electrical signal which when acoustically reproduced simulates a string bass sound, said apparatus comprising:

first circuit means for producing from said square wave signals pulses having a substantially sawtooth waveform and a preselected repetition frequency,

first amplifier means connected to receive said pulses for controlling the amplification of said pulses in accordance with an envelope signal having a short attack time and a relatively long decay time, and

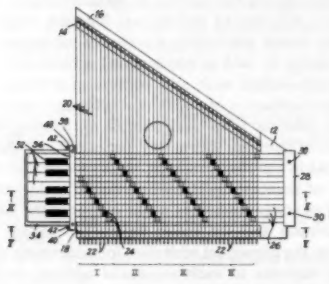
second amplifier means connected to receive amplified pulses from said first amplifier means for altering the harmonic content of the pulses produced at its output as a function of the attack and decay times of said envelope signal and producing an output electrical signal which when acoustically reproduced simulates a string bass sound.

4,175,466

STRINGED MUSICAL INSTRUMENT

Thomas P. Aronis, 95 Christopher St., New York, N.Y. 10014

Filed Jun. 21, 1978, Ser. No. 917,487
Int. Cl.[2] G10D *1/12*
U.S. Cl. 84—288 11 Claims



1. A stringed musical instrument comprising a support;

a plurality of strings secured to said support and adapted to vibrate when strummed, said strings defining a playing area and being arranged in groups of octaves;

a set of manually operable keys disposed outside of said playing area, each key being associated with a corresponding one string in each octave;

a damper bar secured to each key, each damper bar extending in a direction transverse to said strings and disposed beneath said strings, one end of each damper bar being coupled to a pivot point;

a plurality of damper elements secured to each damper bar, the damper elements on a given damper bar being associated with and positioned beneath a respective one string in each of said octaves so that all of said strings are accessible for strumming from above over substantially the entirety of said playing area including portions of said strings overlying said damping elements; and

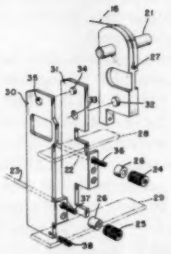
bias means for biasing all of said damper bars to a quiescent position, said bias means being overcome for a damper bar which is pivoted to an operating position in response to the manual operation of the key secured thereto, whereby all of the damper elements secured to said pivoted damper bar are spaced away from their associated strings in each octave to permit said associated strings to vibrate when strummed and all of the damper elements secured to the remaining damper bars are in contact with their associated strings to prevent substantial vibration thereof when said strings are strummed.

4,175,467

STRING MOUNTING APPARATUS

Ronald T. Lashley, Burlington, N.C., assignor to Emmons Guitar Company, Inc., Burlington, N.C.

Filed May 22, 1978, Ser. No. 907,927
Int. Cl.[2] G10D *3/14*
U.S. Cl. 84—312 P 2 Claims



1. A tone adjusting mechanism for a pedal-type musical instrument, comprising:

a string securing bridge member pivotally mounted on an axle, said bridge member adapted to receive a tensioned string thereon;

a first tone changing member pivotally connected to said bridge member;

a second tone change member pivotally connected to said first tone member;

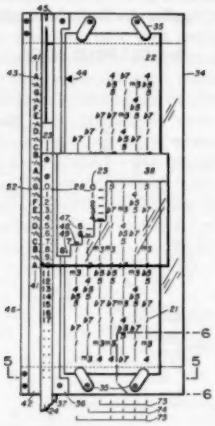
stop means spaced from said axle for providing a rest position for said first and second tone changing members and for providing a pivot fulcrum for said first tone changing member when said second tone changing member is actuated; and

pivot/stop means generally located intermediate said axle and said stop means for providing a pivot fulcrum for said second tone changing member when said second tone changing member is actuated.

4,175,468
METHOD AND APPARATUS FOR MUSIC INSTRUCTION

Robert R. Whitlock, 7138 Hanover Pkwy., Greenbelt, Md. 20770

Filed Oct. 22, 1976, Ser. No. 734,885
Int. Cl.[2] G10G *1/02*
U.S. Cl. 84—485 SR 6 Claims



1. An apparatus for indicating finger pattern information for a musical stringed fingerboard instrument, comprising:

a first base; at least one type of fist indicia on said first base in a fingering pattern specified by pairs of coordinates having first dimension course coordinates representing courses of said stringed fingerboard instrument and second dimension string stop coordinates representing string stops characteristic of musical intervals used in fingering said stringed fingerboard instrument, the direction of increasing said string stop coordinates representing the direction of increasing musical pitch on the stringed fingerboard instrument, said pairs of coordinates forming a mapping image of allowable locations for fingering said stringed fingerboard instrument to sound musical tones of a chord or scale; a tuning reference being present on said first base;

a second base; a string stop series of second indicia on said second base, said second indicia representing an ordinal numbering of string stops of said stringed fingerboard instrument, said ordinal numbering ascending in the same directional sense as the direction of increasing said string stop coordinates of said fingering series, said second indicia having spacings which represent musical intervallic magnitudes characteristically used in stopping the strings of said stringed fingerboard instrument and which are of such size that pairs of indicia of said string stop series align with pairs of string stop coordinates of said fingering pattern, said aligned pairs of string stop coordinates representing the same musical intervallic magnitudes as said spacings of said second indicia thereto aligned, said string stop series being substantially adjacent to said fingering pattern along said second dimension of said fingering pattern, said string stop series and said fingering pattern being alignably repositionable with respect to each other in a direction substantially along said second dimension of said fingering pattern; a principal note reference being present on said second base; and

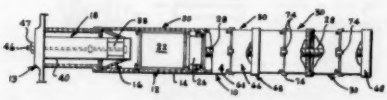
a third base; a negative principal note series of third indicia being on said third base and being substantially adjacent to said string stop series and said fingering pattern and being repositionable with respect to said string stop series and with respect to said fingering pattern in a direction substantially along said second dimension of said fingering pattern and representing a chromatic ordering of note names descending in musical pitch in the same directional sense as the direction of increasing musical pitch as represented by said string stop coordinates of said fingering pattern, pairs of said third indicia having such spacings as to be alignable with pairs of string stop coordinates of said fingering pattern representing the same musical intervallic magnitudes as characterized by said note names represented in turn by said third indicia so aligned;

whereby a fingerboard pattern may be indicated for the desired principal note in any one of a plurality of congruent tunings.

4,175,469
CENTRIFUGAL AEROSOL DISPENSER ASSEMBLY

Harold N. Ritland, Bellevue, and George H. Thacker, Kent, both of Wash., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 1, 1978, Ser. No. 882,526
Int. Cl.[2] F11F *5/02;* F42B *13/50*
U.S. Cl. 89—1 B 10 Claims

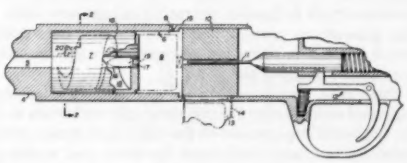


1. A centrifugal aerosol dispenser assembly comprising a mount and a dispenser operatively attached thereto, means for ejecting said dispenser from said mount with a spin motion, a first portion of said ejection means connected to said mount, a second portion of said ejection means connected to said dispenser, a plurality of compartments located within said dispenser, at least one of said compartments being made up of an actuator section and a dispensing section, said dispensing section having removable sides thereon, means located within said actuator section for releasably securing said sides to said dispensing section and means located within another of said compartments for activating said releasing means at a preselected time whereby at said preselected time after ejection of said dispenser from said mount, said releasing means releases said sides of said dispensing section and allows the expulsion of the contents of said dispensing section to take place in a predetermined geometrical configuration.

4,175,470
GUN WITH RAPID FIRING RATE

Frank H. Bell, Brigham City, Utah, assignor to Thiokol Corporation, Newtown, Pa.

Filed Dec. 22, 1977, Ser. No. 863,376
Int. Cl.[2] F41C *13/00*
U.S. Cl. 89—7 4 Claims



1. In a gun having a barrel with a central bore therethrough, and a propellant-cartridge chamber and trigger-operated striker aligned with the bore, the improvement comprising:

a housing, seated between the propellant-cartridge chamber and the bore, having a projectile duct for storing projectiles, a bore alignable with that of the barrel and intersecting both the projectile duct and the propellant-cartridge chamber, and a gas port joining the propellant-cartridge

chamber with the projectile duct, entering the projectile duct at a distance from intersection of the projectile duct with the bore that is equal to the sum of the diameters of the number of projectiles selected to be ejected when a single propellant cartridge is fired.

4,175,471

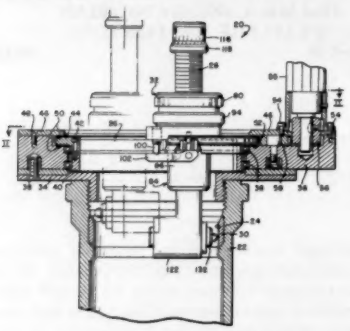
CUTTING APPARATUS AND VERTICAL DRIVE MECHANISM THEREFOR

John F. Wilger, Honolulu; Gregory S. Nakano, Pearl City; Tadao Uyetake, Honolulu; Stephen Orillo, Jr., Wahiawa, and Teikichi Higa, Pearl City, all of Hi., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 19, 1977, Ser. No. 861,911

Int. Cl.[2] B23C *1/20*

U.S. Cl. 408—83.5 **9 Claims**



1. A cutting apparatus for in-place machining of an internal valve surface comprising:

a turntable, means for rotatably mounting said turntable on the valve above the internal valve surface,

a feed shaft mounted through the turntable so as to be rotatable therewith, the longitudinal axis of the feed shaft being spaced from the axis of rotation of the turntable;

a bottom end of the feed shaft having means adapted to receive a cutter for machining the internal valve surface;

vertical drive means mounted on the feed shaft for vertically driving the feed shaft, said vertical drive means being rotatable with the feed shaft and in turn, with the turntable;

the vertical drive means including nut means threaded on the feed shaft and further including gear means operatively connected to the nut means;

means for mounting the vertical drive means to the turntable fixedly along and rotatable about said longitudinal axis of the feed shaft;

said gear means having: a first gear means portion which is fixedly connected to the nut means, a second gear means portion which is fixed in operative engagement with the first gear means portion, and a third gear means portion which is fixed in operative engagement with the second gear means portion; and

said third gear means portion being mounted rotatably in frictional slidable engagement about said nut means so that the firctional engagement of the third gear means portion about the nut means will cause the third gear means portion to rotate with the nut means, however, upon stopping the rotation of the third gear means portion with respect to the nut means, the nut means will frictionally slidably rotate within the third gear means portion, whereby said gear means is operatively connected with the nut means so that, upon rotating the turntable and stopping the rotation of the third gear means portion with respect to the nut means, the second gear means portion is rotated which rotates the first gear means portion which rotates the nut means which then causes the drive shaft to be fed vertically.

4,175,472

ROTARY HYDRAULIC MACHINE

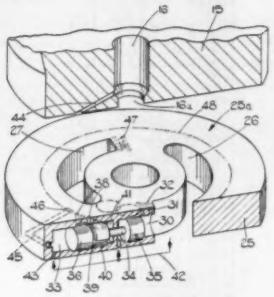
Thomas E. E. Roberts, Birmingham, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Dec. 9, 1977, Ser. No. 858,944

Claims priority, application United Kingdom, Jan. 27, 1977, 3284/77

Int. Cl.[2] F01B *13/04*

U.S. Cl. 91—6.5 **4 Claims**



1. A rotary hydraulic machine, comprising a rotor having a plurality of bores which open onto a face of the rotor, piston means responsive to rotation of the rotor, for causing liquid displacement within said bores to accompany said rotation, a port plate against one face of which said rotor face is engaged, said port plate including a first port with which said bores can successively communicate, valve means, between said first port and said port plate face responsive to pressures in said first port and in said bores for varying the precompression angle at which a liquid within the bores can first flow to said first port, said valve means including a second passage in said port plate communicating with said first port and with port means which open onto said port plate face, said port means being spaced from said port, in the direction of the path of movement of said bores across said face, so that said bores communicate, in use, with said port means before communicating with said first port, said port means extending in said direction of movement, and a control element responsive to an increase in pressures in said bores for progressively uncovering said port means in a direction away from said first port, and to an increase in pressure in said port for progressively covering said port means in a direction towards said first port, and means for admitting liquid to said bores including a plurality of passages in said rotor communicating with respective ones of said bores and having openings onto said rotor face, and a first passage in said port plate, opening onto said port plate face in a loction which lies on the path thereover of said rotor passage openings, said high pressure liquid being applied, in use, to said first passage.

4,175,473

FLUID CIRCUIT

Tomomitsu Iizumi, Tokyo, Japan, assignor to Shoketsu Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 6, 1977, Ser. No. 785,206

Claims priority, application Japan, Jun. 8, 1976, 51-73232[U]; Oct. 27, 1976, 51-143497[U]; Oct. 27, 1976, 51-144309[U]

Int. Cl.[2] F15B *13/042, 11/04*

U.S. Cl. 91—443 **1 Claim**

1. A fluid circuit comprising:

an actuator having a piston-head-side chamber and a piston-rod-side chamber and a first piston separating said chambers;

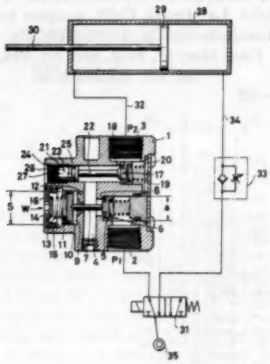
a flow-rate-control, pressure-regulating valve assembly having an inlet port and an outlet port;

a flow-direction change-over valve connected to the inlet port of said flow-rate control, pressure-regulating valve assembly; and

a pressure source connected to said flow-direction change-over valve;

said piston-rod-side chamber being connected to the outlet port of said flow-rate-control, pressure-regulating valve assembly and from the inlet port thereof to said flow-direction change-over valve and through said change-over valve to said pressure source, thereby establishing a first fluid path for a return stroke of said first piston, and a second fluid path connecting said piston-head-side chamber in bypassing relationship around said flow-rate-control pressure regulating valve assembly to said flow-direction change-over valve and therethrough to said pressure source, thereby establishing said second fluid path for an advancing stroke of said first piston,

said flow-rate-control, pressure-regulating valve assembly comprises: a fluid passage in said assembly leading from



said inlet port via a pressure regulating valve and then a flow-rate control valve to said outlet port; said flow rate control valve having a valve body, a valve stem and a valve-stem-position adjustable portion, said valve body being spring loaded so as to be urged against the top of said valve stem, thereby restricting said fluid passage; said pressure regulating valve including a valve body spring-loaded in the direction to close said fluid passage, and a second piston which is spring-loaded so as to force said valve body in the direction to open said fluid passage through the medium of a rod confined between said valve body and said second piston, whereby said second piston permits said pressure regulating valve to maintan a predetermined pressure in a fluid flowing through said fluid passage, said pressure regulating valve further including a communicating hole allowing the introduction of a fluid from said fluid passage to said second piston, whereby when a pressure of a level exceeding a given pressure level is introduced into said fluid passage said second piston is displaced against the spring-loaded effect and hence said rod is pushed back by the spring-loading in said valve body, thereby closing flow through said fluid passage.

4,175,474

VARIABLE DISPLACEMENT PUMP

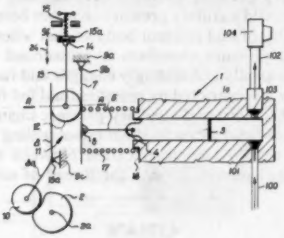
Ladislav Ševčík, Chrastava; Josef Dvořák, and Jiří Mlynář, both of Liberec, all of Czechoslovakia, assignors to Elitex, Koncern textilního strojirenstvi, Liberec, Czechoslovakia

Filed Nov. 15, 1977, Ser. No. 851,784

Claims priority, application Czechoslovakia, Dec. 13, 1976, 8109/76

Int. Cl.[2] F01B *31/14;* F15B *15/24*

U.S. Cl. 92—13.5 **4 Claims**



1. In a variable delivery fluid pump adapted for the feeding of liquid to the nozzle of a jet loom, the pump having a cylinder, a piston which reciprocates in the cylinder, said piston having a piston rod the outer free end of which extends outside an end of the cylinder, and a piston driving means including a driven eccentric means for reciprocating the piston, the improved piston driving means which comprises first and second generally parallel levers disposed outwardly of the outer free end of the piston rod, the levers extending at a substantial angle with respect to the path of reciprocation of the piston, means for pivotally mounting each of the levers for oscillation toward and away from the cylinder, the first lever being disposed nearer the cylinder and being drivingly connected to the outer end of the piston rod, the second lever being disposed further from the cylinder and coacting with the eccentric means so as to be oscillated thereby, and means mounted for adjustment along the length of the levers coupling them for joint oscillatory movement, adjustment of the last named means along the lengths of the levers changing the transmission ratio of both levers.

4,175,475

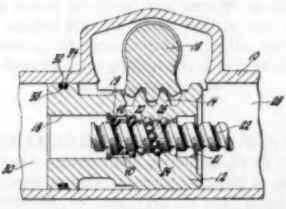
WORM THREAD SEAL FOR STEERING GEAR

Dennis C. Eckhardt, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 30, 1977, Ser. No. 855,883

Int. Cl.[2] F01B *3/08;* F16J *15/40*

U.S. Cl. 92—33 **3 Claims**



1. A vehicle power steering gear comprising a housing, a piston nut slidably mounted in said housing and separating said housing into a pair of primary fluid pressure chambers, said nut having an axially extending bore formed therein, a cylindrical worm extending through said bore into said nut, said worm having a helical thread, thread engaging means carried by said nut and operatively engaged with said thread of said worm so that rotation of said worm will axially slide said nut in said housing, a seal assembly for restricting the fluid passage be-

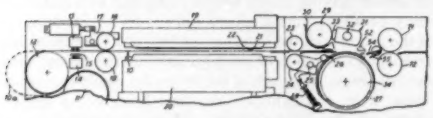
tween said chambers through said helical thread of said worm, said seal assembly comprising a resilient body terminating in radially extending sealing surface means, said bore being enlarged to form a cavity for said seal assembly and to provide a radial contact wall for said sealing surface means thereof, said resilient body having internal thread means for engaging the helical thread of said worm, backing means laterally spaced from said contact wall and carried by said nut for trapping said resilient body in said cavity, said seal assembly cooperating with said radial contact wall and said backing means for forming an auxiliary pressure chamber between said nut and said resilient body, said auxiliary pressure chamber being concentrically outwardly of said resilient body so that when one of said primary fluid pressure chambers is pressurized said sealing surface means axially and sealingly engages said radial wall and said seal body is constricted by pressure fluid fed from said one of said chambers into said auxiliary pressure chamber radially inwardly against said worm to effect radial sealing therewith to thereby prevent fluid communication between said primary fluid pressure chambers through the thread of said worm.

4,175,476

METHOD AND APPARATUS FOR FORMING REINFORCED TOP FILE FOLDERS

Arthur H. Kidd, Menomonee Falls, Wis., assignor to H. G. Weber & Co., Inc., Kiel, Wis.

Filed Mar. 27, 1978, Ser. No. 890,293
Int. Cl.[2] F15B *21/04*
U.S. Cl. 93—1 E **7 Claims**



1. An apparatus for forming reinforced top file folders which comprises:

means for feeding a paperboard web to a cutting and scoring station,

means at said cutting and scoring station for severing the web transversely and also for forming a score line a relatively short distance behind the leading edge of the portion thus severed, thereby defining a tab portion,

applicator means for applying an adhesive to a portion of the web immediately behind said score line,

hold down means beyond said applicator means having a portion arranged to be seated in said score line,

turnover means positioned beyond said hold down means for folding the tab portion at right angles to said web while said score line is seated in said hold down means, and

pressure means beyond said turnover means positioned to fold the tab portion while at right angles to said web against the adhesive striped web to thereby produce a double thickness at the leading edge of said web.

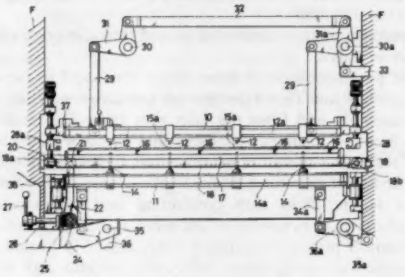
4,175,477

PLATE TYPE PUNCHING MACHINE

Tadao Inose, 20-52, 2-chome, and Minoru Hirota, 20-13, 2-chome, both of Higashi, Koga-shi, Ibaragi-ken, Japan

Filed Nov. 10, 1977, Ser. No. 850,346
Claims priority, application Japan, Jul. 5, 1977, 52-79455
Int. Cl.[2] B31B *1/74*
U.S. Cl. 93—36 A **3 Claims**

1. A plate type punching machine comprising a machine frame, rails along both sides of the machine frame, endless chain belts guided by the rails, sheet holding pawls carried by the belts, a board on which a sheet held by the sheet holding pawls is placed, a support for said board, a mount on which the support is mounted, rods pivotally joined to one side end of the mount, a first gear, eccentric shafts connecting the first gear and the rods, a handle, and a second gear connected to the handle and meshed with the first gear, said mount having its other side end pivotally joined to the machine frame so that



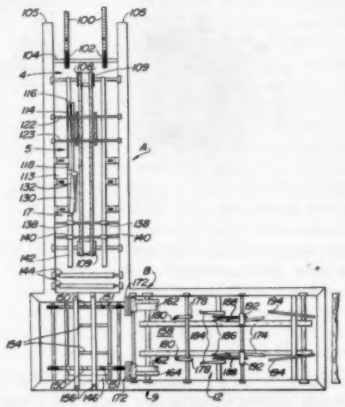
when one side end of the mount is pivoted downwardly by operation of the handle the board and support is drawn out from below the rails to one side of the machine frame.

4,175,478

EXPANSIBLE GUSSET ENVELOPE AND METHOD AND APPARATUS FOR FABRICATING SAME

John G. Tripler, La Mirada, Calif., assignor to American Fiber Velope Manufacturing Co., Collingdale, Pa.

Filed Mar. 13, 1978, Ser. No. 886,331
Int. Cl.[2] B31B *29/26*
U.S. Cl. 93—62 **9 Claims**



1. In a machine for fabricating an expansible gusset envelope from a blank having first and second panels hinged to each other along triple transverse fold lines defining inwardly collapsible bottom gusset sections therebetween, scored isosceles triangular portions at the margins of said bottom gusset sections having apices facing each other along the medial transverse fold line, break-away flaps at the margins of said second panel defined by lateral fold lines coextensive with the apices, side flaps hinged to the lateral edges of said first along triple longitudinal fold lines which define inwardly collapsible side gusset sections therebetween, and triangular tabs hinged to the side gusset sections along a line registering with the inboard transverse fold line and hinged to each other along a line registering with the medial longitudinal fold line to define isosceles triangular projections substantially congruent with said scored isosceles triangular portions, apparatus comprising:

(a) bendling means for folding said isosceles triangular projections into overlying disposition with the lower margins of said side gusset sections, and inwardly folding said

bottom gusset sections so that said second panel is in overlying disposition with said first panel,

(b) flaring means for outwardly folding said break-away panels along the lateral fold lines so that the isosceles triangular portions break open and are in exposed side-by-side disposition with the isosceles triangular projections

(c) means for folding said flaps so that the isosceles triangular projections are adhesively secured to said isosceles triangular portions

(d) curling means for outwardly then inwardly folding said side flaps along the medial and outboard fold lines and adhesively securing said side flaps to the outer margins of said second panel, wherein all gusset sections are inwardly collapsed with doged corners.

4,175,479

CIGARETTE-FILTER-MAKING APPARATUS

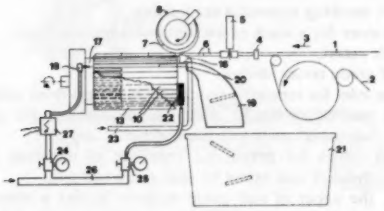
Marcel-François Roullier, Préverenges, Switzerland, assignor to Baumgartner Papiers S.A., Crissier, Switzerland

Filed Jun. 12, 1978, Ser. No. 914,418

Claims priority, application Switzerland, Jun. 21, 1977, 7626/77

Int. Cl.[2] **A24C** *5/50*

U.S. Cl. 93—77 FT **7 Claims**



1. Cigarette-filter-making apparatus comprising means for forming a cigarette-filter-string, separating means for cutting the cigarette-filter-string into individual filter sections of a given length, a pick-up drum rotatable about its longitudinal axis and provided along its circumference with longitudinally extending retaining grooves for the accomodation of the individual filter sections and lateral delivery of the filter sections retained in said grooves to a laterally adjacent discharge as well as quality control means for continuously controlling the cigarette-filter string and/or the individual filter sections prior to their delivery into the retaining grooves of the pick-up drum, characterised in that the pick up drum (**9**) is provided with a guide element (**13**) extending continuously over a cylindrical surface from the pick-up point (**11**), to the delivery station (**12**) of the drum (**9**), viewing in the direction of drum rotation, to prevent the filter sections (**6**) from dropping out of the retaining grooves (**10**), and in that ejector blasting means (**18**) are provided outside of the drum which are operatively associated with the quality control device (**4**) and controlled by the latter to blow filter sections (**6**) out of the retaining grooves (**10**) on the drum (**9**) in the longitudinal direction of said grooves.

4,175,480

WALL VENTILATOR CONSTRUCTION

Dennis A. Beam, Jr., Westfield Rd., and Paul M. Sarazen, Jr., 214 Fairway Dr., both of Shelby, N.C. 28150

Filed Jan. 13, 1978, Ser. No. 869,057

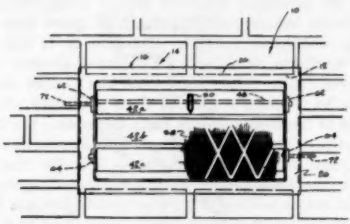
Int. Cl.[2] **F24F** *7/00*

U.S. Cl. 98—37 **5 Claims**

1. An improved ventilator construction for a building wall comprising:

a. a generally rectangular support frame having opposed top and bottom walls and side walls defining a passageway therethrough, flange means attached to and extending outwardly from said walls generally perpendicular to the axis of said passageway for overlying the peripheral portion of an opening in a wall, and spaced openings through opposed of said support frame walls for receiving fastening means therethrough;

b. a generally rectangular ventilator box having opposed top and bottom walls and side walls defining an air passageway therethrough, screen means disposed across said air passageway, adjustable closure means in said ventilator box passageway and supportably attached to said ventilator box for opening and closing said passageway to the flow of air, and a plurality of spaced apart connection



elements secured to opposed wall portions of said box generally parallel to the axis of said air passageway therethrough, said connection elements being spaced apart, protruding beyond the outer surface of said screen means and including openings disposed therethrough for alignment with said spaced openings in said support frame walls when said support frame and ventilator box are positioned in contiguous relation with their passageways aligned, whereby fastening means may be inserted through said aligned openings to secure said support frame and ventilator box together and within the opening of a building wall.

4,175,481

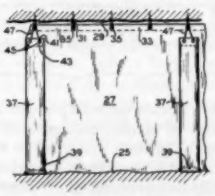
MINE VENTILATION SYSTEM AND ELEMENTS THEREOF

James V. Burgess, Jr., Madison, W. Va., assignor to Mine Ventilation Systems, Inc., Madison, W. Va.

Filed Jul. 5, 1977, Ser. No. 812,719

Int. Cl.[2] **E21F** *1/14*

U.S. Cl. 98—50 **7 Claims**



1. A mine ventilation control system providing a barrier for the segregation of gas flow between at least two regions of a mine cavity; said system comprising:

a flexible substantially gas impervious sheet material extending between said regions to impede gas flow therebetween;

means for securing marginal edge portions of said sheet material to an adjacent mine surface;

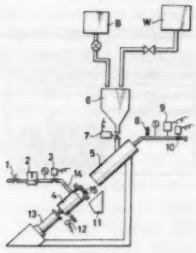
an elongate envelope of flexible sheet material for containing a fluid mass;

a fluid mass in said envelope; and

means to maintain said fluid filled envelop proximate to and extending generally vertically along said sheet material

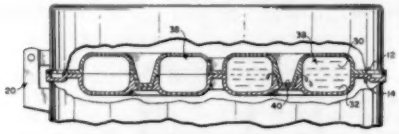
whereby said mass and the stiffness of said filled envelope militate against ballooning of said sheet material.

4,175,482
AUTOMATIC HIGH-PRESSURE FLASH COOKER
Teruo Kumagaya, Iida, Japan, assignor to Asahimatsu Koridofu Kabushiki Kaisha, Nagano, Japan
Filed Sep. 12, 1978, Ser. No. 941,792
Claims priority, application Japan, Sep. 22, 1977, 52/114059
Int. Cl.[2] A47J *27/04*
U.S. Cl. 99—330 **2 Claims**



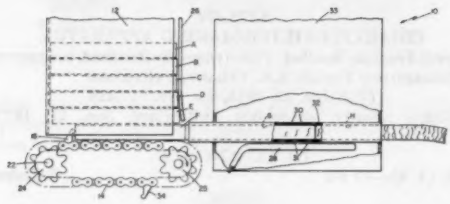
1. An automatic high-pressure flash cooker comprising a cylindrically-shaped steaming chamber which is set in a slanted position with its lower end open, and a drain collector which has at its upper end a perforated plate permitting passage of water and is connectable with the open end of said steaming chamber, said steaming chamber being communicated with a feed hopper for supply of water and beans, said drain collector being communicated with a vapor source and provided with an opening for exhausting water therefrom.

4,175,483
DONUT MAKER APPLIANCE WITH IMPROVED MEANS FOR COATING BATTER WITH COOKING OIL
Robert H. Clark, Columbia, Mo., assignor to McGraw-Edison Company, Elgin, Ill.
Filed May 18, 1978, Ser. No. 907,045
Int. Cl.[2] A21B *5/08*
U.S. Cl. 99—354 **4 Claims**



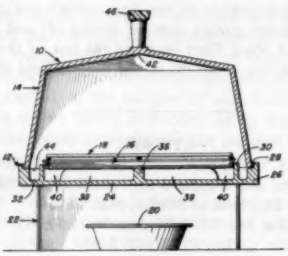
1. In a donut maker device including upper and lower grids movable into and out of mating engagement along first surfaces thereof, means for heating said grids to a predetermined temperature, each of said first surfaces of said upper and lower grids defining a recess of a predetermined shape with a central core, the recess of the lower grid having a predetermined depth, the recess of the upper grid being disposed for cooperation with the recess of the lower grid upon bringing the upper and lower grids into mating engagement, thereby to produce a predeterminedly shaped cooking cavity in which batter placed therein is baked to produce a similar shaped cake, the improvement comprising cooking oil dispersion means including plunger means of a predetermined shape provided on the first surface of said upper grid at the central core of said concave recess extending outwardly therefrom and well means defined on the first surface of said lower grid at the central core of said annular recess for receiving cooking oil, said well means being predeterminedly dimensioned to have a depth substantially equal to the depth of the lower grid said well means further being shaped complementarily to said plunger means and positioned for receipt thereof upon bringing the first surfaces of the upper and lower grids into mating engagement, receipt of said plunger means in said well means serving to dispose cooking oil therein onto the batter as well as to align the upper and lower grids.

4,175,484
FOOD SMOKING
Frederic S. Tobey, P.O. Box L, Brewster, Mass. 02631
Filed Jun. 23, 1978, Ser. No. 918,461
Int. Cl.[2] A23B *4/04*
U.S. Cl. 99—482 **19 Claims**



1. A smoking apparatus comprising:
a container for a stack of smoke-producing members,
a guide retort,
said guide retort having
an inlet for receiving successive members from said stack,
a pair of vertically spaced guide surfaces for guiding successive members therebetween, and
an outlet for permitting expelling of members guided through said retort by said guide surfaces,
the upper of said guide surfaces having a plurality of holes therethrough for permitting smoke from said members to leave said retort,
means to drive successive members of said stack into said guide retort,
heating means positioned adjacent to and outside of said guide retort, and
a food enclosure positioned adjacent to said guide retort to receive smoke passing through the holes of said upper guide surface.

4,175,485
QUICK SMOKER
Harold F. Wojahn, 303 Ibis La., Satellite Beach, Fla. 32937
Filed Oct. 27, 1978, Ser. No. 955,191
Int. Cl.[2] A23B *4/04*
U.S. Cl. 99—482 **9 Claims**



1. In a portable food smoker, a base and a cooperating lid, said base comprising a planar bottom panel, a side wall projecting inwardly from said bottom panel peripherally thereabout, said side wall having a top edge, an inwardly directed support ledge defined along the top edge of the side wall, a partition

wall projecting upwardly from said bottom panel in inwardly spaced generally parallel relation to said side wall, said partition wall being generally coextensive with said side wall and defining a moisture retaining channel between the partition wall and the side wall inwardly of said support ledge, said lid being of a generally dome-shaped configuration and including a peripheral lower edge adapted to seat directly on said support ledge completely about said base whereby moisture collecting within said lid will travel downwardly for collection within said moisture channel.

4,175,486

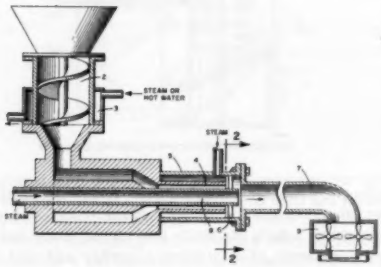
PROTEIN TEXTURIZATION

William M. Hildebolt, Mickleton, and Murray T. Hundt, Maple Shade, both of N.J., assignors to Campbell Soup Company, Camden, N.J.

Division of Ser. No. 645,613, Dec. 31, 1975, Pat. No. 4,095,001. This application Jan. 10, 1978, Ser. No. 868,451

Int. Cl.[2] A23C *3/02*

U.S. Cl. 99—483 **11 Claims**



1. Apparatus for texturizing protein material comprising:
(a) die means for extruding a continuous, relatively thin sheet of semi-rigid protein material;
(b) means for externally applying heat to both surfaces of said thin sheet as it passes through said die means to effect surface texturization of said thin sheet;
(c) means defining a confined treating zone communicating with said die means;
(d) means for directing a heated gaseous stream at said extruded thin sheet as it enters said confined zone to break off the leading segment of said extruded sheet; and
(e) means for recovering said texturized protein material.

4,175,487

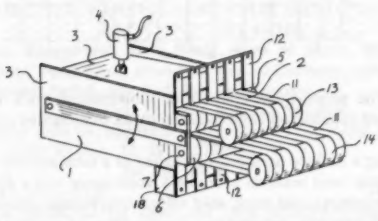
BALE FORMING APPARATUS

Joseph Molitorisz, 624 81st Ave. NE., Bellevue, Wash. 98004

Filed Jul. 12, 1978, Ser. No. 923,829

Int. Cl.[2] B65B *13/20*

U.S. Cl. 100—8 **2 Claims**



1. A bale forming apparatus to compress loose fibrous agricultural crops or industrial products into substantially rectangular bales which are being held together by twine, wire or belts, said bale forming apparatus comprising; a longitudinally extending and substantially rectangular bale forming channel assembly, and a feeder-compactor assembly, said bale forming channel assembly having a substantially rectangular intake port, and being confined by longitudinally extending lateral boundaries, at least one of said lateral boundaries being flexibly suspended and inwardly biased by suitable biasing means, said inwardly biased lateral boundaries being in frictional contact with said formed bale exerting frictional resistance against the movement of said formed bale in said bale forming channel, said bale forming apparatus having a suitable mechanism to wrap and tie said wire, twine or belt around said formed bale, said feeder-compactor assembly consisting of; a plurality of feeder-compactor rollers rotatably supported by a common frame and being held substantially parallel relative to each other and at an adjustable distance to confine a transverse intake opening between their adjacent rotational peripheral surfaces, each of said feeder-compactor rollers having a longitudinally extending shaft holding a plurality of substantially cylindrical compactor disks securely fastened to said shaft to receive rotational drive, said compactor disks being separated from each other by substantially cylindrical pulleys, said pulleys being rotatably mounted on said shaft, said feeder-compactor assembly being guided by suitable means to move in a plane at or near to said intake port of said bale forming channel between two of the opposite boundaries of said intake port, said feeder-compactor assembly being suspended by a plurality of belts, chains or ropes being securely attached to said compactor disks of said feeder-compactor rollers, allowing said belts, chains or ropes to wrap around said compactor disks when said feeder-compactor rollers receive rotational power drive, the opposite ends of said belts chains or ropes being securely attached to suitable structural components of said bale forming channel, said belts, chains or ropes being extended between said feeder-compactor rollers and said suitable structural components of said bale forming channel in such way that those chains, belts or ropes being securely attached to the compactor disks of said upper feeder-compactor roller are also being securely attached to said suitable structural component at or near the upper boundaries of said bale forming channel, said chains, belts or ropes being securely attached to said compactor disks of said lower feeder-compactor roller are also being securely attached to said suitable structural component at or near said lower boundaries of said bale forming channel, said belts, chains or ropes being used to suspend said feeder-compactor assembly and to partially cover said intake port of said bale forming channel, holding the deposited layers of the bale being formed in said bale forming channel, said feeder-compactor rollers receiving external power drive to cause simultaneous rotational motion for each of said feeder-compactor rollers, said simultaneous rotational motion being in identical direction at a substantially identical peripheral speed of said feeder-compactor rollers, said simultaneous rotational motion of said feeder-compactor rollers being reversed at suitably selected intervals causing the wrapping of said chains, belts or ropes around said compactor disks inducing the movement of said feeder-compactor assembly in said plane between or beyond said upper and lower boundaries of said intake port of said bale forming channel, said rotatably mounted pulleys of said feeder-compactor rollers being connected to suitably positioned feeder-rollers by a plurality of endless chains, belts or ropes, said feeder-rollers being journally mounted in a suitable frame and receiving power drive to cause their rotation in such a way that the interaction between said plurality of said endless chains, belts or ropes connecting said feeder-compactor rollers and said corresponding feeder-rollers compress the loose fibrous material into a sheet like configuration and convey said sheet of compressed material to said intake port of said bale forming channel regardless of the direction of rotation of said feeder-compactor rollers, said feeder-compactor rollers receiving and laying said compressed sheet of fibrous material in a plane which is confined by the lateral boundaries of said intake port of said bale forming channel, said laying of the compressed sheet of fibrous material being accomplished in a continuous process by reversing the direction of the movement

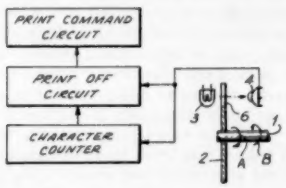
of said feeder-compactor assembly in said plane at or near said intake port of said bale forming channel at properly selected positions relative to said upper and lower boundaries of said intake port of said bale forming channel, said reversal of the direction of motion of said feeder-compactor assembly in said plane at or near said intake port of said bale forming channel causing the reversal of the laying of said compressed fibrous sheet, folding said sheet at or near to said upper and lower boundaries of said intake port of said bale forming channel resulting in the building up the body of said formed bale by depositing and compressing the subsequently folded layers in said bale forming channel, said feeder-compactor rollers exerting compressive forces on said formed bale composed of a plurality of layers of folded compressed sheets of said fibrous material causing the compaction and sliding movement of said formed bale in said bale forming channel, said formed bale having reached its desired length being tied together by a suitable tying mechanism with twine, wire or belt, said formed and tied bale being forced out from said bale forming channel at its discharge end by the subsequently formed bales, said individual bales being separated by said tying means.

4,175,488

PRINTER

Masahiro Minowa, Shiojiri, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation of Ser. No. 483,753, Jun. 27, 1974, abandoned.
This application May 12, 1976, Ser. No. 685,582
Claims priority, application Japan, Jun. 27, 1973, 48-72422
Int. Cl.[2] B41J *1/44*
U.S. Cl. 101—99 **4 Claims**



1. In a printer including a character ring having print characters circumferentially disposed thereabout, said print characters being selectively positioned in a print position by rotation of said character ring in a first rotational direction from a rest position to a print position, the improvement comprising a detection means for generating character selection timing pulses representative of each rotational position of said character ring, said detection means further producing return timing pulses in response to the rotation of said character ring in a second rotational direction from said print position to said rest position, and print-off producing means for sensing the last said return timing pulses and in response thereto producing a print-off pulse.

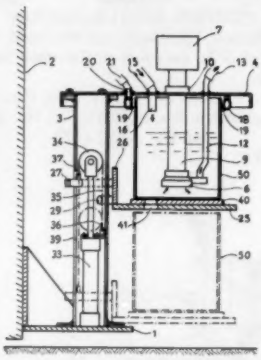
4,175,489

INKING AND WASHING CIRCUIT FOR A FLEXOGRAPHIC PRINTING MACHINE

Yves Gattus, Villeurbanne, France, assignor to S. A. Martin, Villeurbanne, France

Filed May 31, 1978, Ser. No. 911,144
Int. Cl.[2] B41F *31/08, 35/04*
U.S. Cl. 101—366 **2 Claims**

1. An inking and washing device for use in the inking and washing circuit of a flexographic printing machine which circuit comprises a feed pump assembly of the immersion type, said feed pump assembly comprising a feed pump for drawing ink from a reservoir and having a delivery tube, and a drive motor for driving said pump, a circuit for feeding ink from said pump delivery tube to inking rollers, and a circuit for returning ink to the reservoir, said inking and washing device comprising: a fixed horizontal plate; means for mounting said plate on the framework of the printing machine; means supporting said feed pump assembly on said plate with said drive motor above said plate, said pump below said plate and said delivery tube passing through said plate; means fixedly connecting said delivery tube above said plate to said ink feed circuit; a fixed ink return tube which passes through said plate; means fixedly connecting said return tube above said plate to said ink return circuit; washing nozzle means fixed underneath said plate and above a closed shape which surrounds the components of said pump assembly and said ink return tube; means fixedly connecting said washing nozzle means to a water-feed circuit; at least one container for forming an ink reservoir and having a top opening which fits inside said closed shape but surrounds the components of said pump assembly and said ink return tube; at least one washing container having a top opening which fits outside said closed shape and includes an overflow connectable to waste; and lifting means for selectively receiving one of said ink reservoir container or one of said washing container, and for moving said one selectively received container under said plate between a high position in which its upper edge is adjacent said plate and low position in which its upper edge lies below said pump.

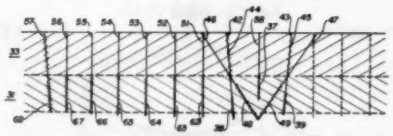


4,175,490

PROCESS FOR PRODUCING AN UNDERGROUND ZONE OF FRAGMENTED AND PERVIOUS MATERIAL

Keith C. Britton, San Leandro, and Mitchell A. Lekas, Concord, both of Calif., assignors to Geokinetics Inc., Concord, Calif.

Filed Nov. 3, 1977, Ser. No. 848,091
Int. Cl.[2] F42D *3/04*
U.S. Cl. 102—23 **55 Claims**



1. The process for converting subterranean rock into an enclosed rubble-ized zone overlain by an overburden comprising:

lifting a defined area of overburden as a substantially monolithic land mass to produce a void space and a free face proximate said rock, said raised overburden providing a substantially impervious closure for said space and said zone as provided herein;

placing an explosive charge in said rock proximate to and for blasting against said face; and

exploding said charge for fragmenting and rock to distribute

said space, thus producing fractured pervious rubble-ized rock in a defined enclosed zone.

4,175,491

WARHEAD AND ANTI-TANK MISSILE CONSTRUCTION

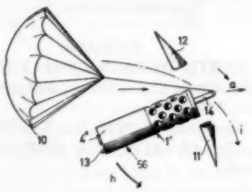
Franz R. Thomanek, Landkreis Schrobenhausen, Fed. Rep. of Germany, assignor to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 692,928, Jun. 4, 1976, abandoned, which is a continuation of Ser. No. 767,529, Oct. 14, 1968, abandoned, which is a continuation-in-part of Ser. No. 670,520, Sep. 21, 1967, abandoned. This application Dec. 7, 1977, Ser. No. 858,335

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1966, 89257; Oct. 14, 1967, 94951

Int. Cl.[2] F42B *13/10*

U.S. Cl. 102—56 SC **3 Claims**



1. A ground-to-ground missile construction for use against an armored target or the like arranged to be fired in a parabolic trajectory extending generally in the horizontal direction comprising an axially extending body having a head portion at the forward end and a tail portion at the rearward end in the as fired position of the missile, a tubular casing portion adjacent said head portion and extending rearwardly therefrom in the axial direction of said body and having an explosive charge disposed therein, braking and stabilizing means carried by said body in the head portion thereof and being selectively deployable outwardly from the head portion of said body for temporarily destabilizing the missile out of its as fired parabolic trajectory path and turning the missile approximately 90° with the axis of said body portion being displaced from a generally horizontal position to a generally vertical position and with said head portion positioned vertical above said tail portion by decreasing the speed thereof whereby upon restabilization the missile drops substantially vertically with the tail portion thereof leading in the downward direction trailed by the head portion onto the target, and an ignition device mounted on and projecting outwardly from said tail portion in the axial direction of said body and connected to said charge so that when said tail portion lands at the target area said ignition device extending said tail portion contacts the target area and explodes the charge.

4,175,492

PROJECTILE, PARTICULARLY FOR HAND FIREARMS AND LONG FIREARMS

Jurgen Knappworst; Uwe Brede, both of Furth, and Erich Zeiher, Furth-Vach, all of Fed. Rep. of Germany, assignors to Dynamit Nobel, AG, Fed. Rep. of Germany

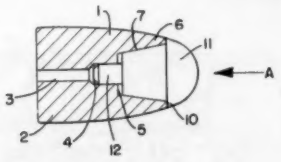
Filed Oct. 28, 1977, Ser. No. 846,546

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1976, 2650136; Jun. 22, 1977, 2728040

Int. Cl.[2] F42B *11/10*

U.S. Cl. 102—92.6 **29 Claims**

1. A projectile for hand and long firearms comprising a projectile body having a longitudinal axis, a front face and a rear face, deformation cavity means extending partially into the projectile body at the front face thereof, continuous axial bore means provided in the projectile body in communicating relationship with the rear face and the deformation cavity means, the projectile body having a wall thickness in the region surrounding the deformation cavity means which is substantially smaller than the wall thickness in the region surrounding the axial bore means, and cap means initially disposed in the region of the front face of the projectile body for covering at least the deformation cavity means, the cap means being separated from the projectile body within the barrel of the firearm during firing of the projectile and exiting from the



barrel in front of the projectile body, the projectile body being configured such that the projectile body upon impingement on a soft target is radially expanded in the region surrounding the deformation cavity means so that the projectile body is substantially enlarged in cross section whereas the projectile body upon impingement on a hard target is radially expanded to a smaller extent and axially compressed to a larger extent in the region surrounding the deformation cavity means than upon impingement on a soft target.

4,175,493

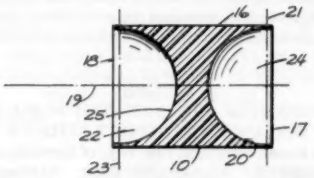
PATCH FOR MUZZLE LOADING FIREARMS

John Daily, P.O. Box GG, Jackson Hole, Wyo. 83001

Filed Nov. 7, 1977, Ser. No. 848,808

Int. Cl.[2] F42B *13/16*

U.S. Cl. 102—93 **5 Claims**



1. A patch for loading a unitary spherical projectile within the rifled bore of muzzle loading firearms having alternating lands and grooves, comprising:

a solid integral body of yieldable material having a longitudinal length measured along a central axis;

an exterior cylindrical wall extending uninterrupted and continuously along the full longitudinal length of said body and centered along said central axis, said wall terminating at opposed ends of said body along planes perpendicular to said axis, the diameter of said wall being substantially equal to the bore diameter of the rifled bore in which it is to be inserted;

a first indentation extending axially inward from one end of the body and centered along said axis, the surface configuration within the first indentation being spherical and being radially sized to result in a slight interference fit between the first indentation and a projectile, the spherical center of said first indentation being located inward from said one end of the body;

a second indentation extending axially inward from the remaining end of the body and centered along said axis;

the combined axial depth of the two indentations being less than the longitudinal length of said body, whereby the indentations are axially separated by a central body portion having a solid cylindrical configuration.

4,175,494

FLUID PRESSURE ACTUATOR INTERCONNECTED BOGIES

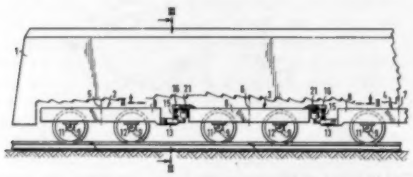
Peter Moser, Dietlikon, Switzerland, assignor to Schweizerische Lokomotiv-und Maschinenfabrik, Winterthur, Switzerland

Filed Jul. 17, 1975, Ser. No. 596,836

Claims priority, application Switzerland, Jul. 25, 1974, 10261/74

Int. Cl.[2] **B61F** *3/08, 5/22, 5/38, 5/50*

U.S. Cl. 105—176 **13 Claims**



1. A rail vehicle comprising

at least two bogies, each having an end proximal to the other and being rotatable about a vertical axis; and

a coupling means coupling said two bogies together, said coupling means including two pairs of fluid pressure operated reciprocating actuators, each actuator of each said pair of actuators having a longitudinal axis extending downwardly at an inclined angle toward to a longitudinal central vertical plane through a respective bogies and being positioned on one of respective opposite sides of said plane and pivotally connected at one end to a proximal end of a respective bogie and at an opposite end to a body to rotate in a universal manner, each said actuator including a pair of chambers for receiving fluid and a piston slidably mounted between said chambers, and pressure lines connected to each of said chambers to interconnect said actuators whereby a rotary movement of one of said bogies in one direction causes a rotary movement of the other of said bogies in an opposite direction.

4,175,495

ENTRANCE STEP ARRANGEMENT FOR A SHORT DISTANCE TRANSPORT VEHICLE

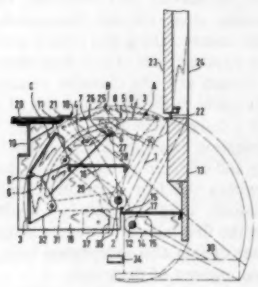
Karl-Heinz Kleim, Nürnberg, Fed. Rep. of Germany, assignor to Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Nürnberg, Fed. Rep. of Germany

Filed May 11, 1977, Ser. No. 795,755

Claims priority, application Fed. Rep. of Germany, May 11, 1976, 2620683

Int. Cl.[2] **B61D** *23/02;* **B61K** *13/04;* **B60R** *3/02*

U.S. Cl. 105—450 **15 Claims**



1. A vehicle, especially short distance rail vehicle, having a door opening, a door for closing and opening said door opening, flooring means adjacent said door opening and partly defining a recess means below said flooring means, at least one intermediate step arranged in said recess means, a foldable guard plate likewise partly defining said recess means and provided with a tread having an edge therewith, said guard plate being pivotable into a position to a level lower than said at least one intermediate step and offset relative to the latter so as to form a stair-like arrangement with said at least one step, said flooring means having a passage therethrough to permit a person to pass therethrough, foldable cover means including at least two leaves operable selectively to move pivotally from a first position behind the tread edge in which it closes said passage means while forming a part of said flooring means to a second position in said recess in which it frees said passage and is spaced from said foldable guard plate so as to permit a person stepping on said at least one intermediate step to pass through said passage, and guiding cam means including rollers and a track engaged thereby at the start of opening movement of said foldable cover means as well as a saddleshaped surface engaged by the rollers in the second position.

4,175,496

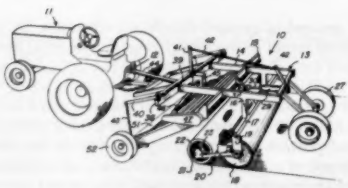
EARTH WORKING IMPLEMENT

Glenn Rehbein, Circle Pines, Minn., assignor to Robark, Inc., Circle Pines, Minn.

Filed Dec. 12, 1977, Ser. No. 859,974

Int. Cl.[2] **A01C** *1/04;* **A01B** *59/00*

U.S. Cl. 111—1 **1 Claim**



1. In an apparatus for installing netting beneath a layer of seeded topsoil for producing net-reinforced grass sod, said apparatus adapted to be trailed behind a tractor and including means for transferring power from said tractor to said apparatus, and further comprising a net roller for dispensing a layer of netting along the ground as the apparatus is trailed, earth moving blades moveable about an apron for lifting soil from the earth and transporting it rearwardly along said apron to deposit it on the netting, and a compacting roller to compact said soil after deposit onto said netting, the improvement comprising:

a pair of wheels rotatably mounted to said apparatus and moveable between a first operating position wherein said net roller, said earth moving blades and said compacting roller are all at least in part contact with the ground; and a second traveling position wherein said net roller, said earth moving blades and said compacting roller are raised above the ground and said apparatus may be freely trailed behind said tractor; and

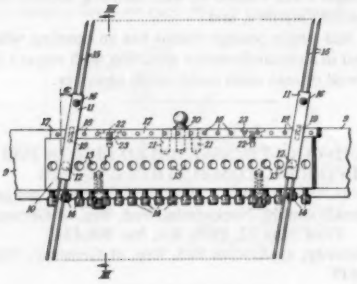
a first lever arm operably connected to a support frame for said pair of wheels, said first lever arm having a hydraulic cylinder connected thereto on a first side of its rotational axis and a chain connected thereto on a second side of its rotational axis, said chain being further connected to a second lever arm, said second lever arm being operably connected to a support frame for said apron, actuation of said cylinder causing said first arm to rotate and to in turn rotate said second arm by tension on said chain, whereby actuation of said cylinder simultaneously causes said wheels to move to said traveling position and said net roller, earth moving blades, and compacting roller to be raised.

4,175,497

KNIFE ASSEMBLY FOR A TUFTING MACHINE

Ernest K. Lund, Accrington, England, assignor to Edgar Pickering (Blackburn) Ltd., Blackburn, England

Filed Dec. 6, 1977, Ser. No. 858,027
Int. Cl.[2] D05C *15/24*
U.S. Cl. 112—79 R 4 Claims



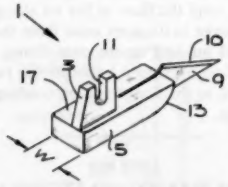
1. A knife assembly for a tufting machine comprising a knife bar, a plurality of knife blocks mounted side by side on the knife bar, the knife blocks carrying projecting pegs respectively extending from each of said knife blocks into one of a row of uniformly spaced retaining holes in one side of the knife bar, a clamping screw positioned to maintain each projecting pin in a retaining hole, a plate mounted on top of the knife bar, a row of uniformly spaced pins carried by the plate which engage corresponding slots in the faces of the knife blocks from which the pegs project to determine their orientation with respect to the knife bar, the pins being laterally offset by the same amount with respect to the retaining holes, means for detachably connecting the plate to the knife bar in at least two alternative positions providing orientatation of the knife blocks to the knife bar at different angles, and knives mounted in the knife blocks.

4,175,498

SEWED SEAM RIPPER

Dean Walters, 10581 Folsom Blvd., Rancho Cordova, Calif. 95670

Filed Feb. 1, 1978, Ser. No. 874,128
Int. Cl.[2] D05B *37/04*
U.S. Cl. 112—129 8 Claims



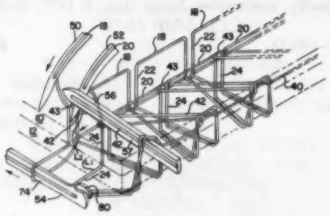
1. A seam ripper adapted for mounting on a sewing machine in place of the pressure foot comprising a solid quadrilateral foot having a downwardly and rearwardly slanted front face and a rearwardly extending elevational slit adapted to receive a frictionally engageable cutting blade, a shank secured to said foot and disposed upwardly therefrom and said shank having a downwardly extending notch therein, blade retaining means on said foot and a vertically disposed cutting blade frictionally engaged in said slit and retained in said foot by said blade retaining means, the bottom edge of the blade being substantially co-extensive with the bottom edge of the foot.

4,175,499

METHOD AND APPARATUS FOR FORMING AN OVEREDGE STITCH

Gerald S. Navlyt, Woodstock, Ill., assignor to Union Special Corporation, Chicago, Ill.

Division of Ser. No. 829,303, Aug. 31, 1977, Pat. No. 4,117,792.
This application Jul. 20, 1978, Ser. No. 926,187
Int. Cl.[2] D05B *1/22*
U.S. Cl. 112—165 6 Claims



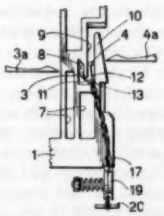
1. A sewing machine comprising:
a pair of thread carrying needle means;
a first means operative to secure the thread of one of said needle means in said workpiece and to seize and distend the thread of the other needle means, said first means operative including means for carrying a thread; and
a second means operative to cooperate with said first means operative and the threads carried thereby in the formation of an overedge stitch.

4,175,500

DEVICE FOR ALIGNING CHAINS OF STITCHES IN A TWO-NEEDLE SEWING MACHINE

Angelo Radice, and Giovanni Palacino, both of Milan, Italy, assignors to Rockwell-Rimoldi S.p.A., Milan, Italy

Filed Apr. 3, 1978, Ser. No. 893,114
Claims priority, application Italy, Apr. 28, 1977, 22903 A/77
Int. Cl.[2] D05B *1/10, 49/00*
U.S. Cl. 112—166 4 Claims



1. A needle plate with spaced needle holes for a two needle sewing machine of the type for simultaneously forming a straight stitch chain and an overcast stitch chain in a workpiece and with a separate looper and looper thread operatively associated with each needle, the improvement comprising:
(a) means interconnecting the spaced needle holes for permitting movement of the straight stitch chain into alignment with the overcast stitch chain upon completion of each sewing cycle;
(b) a thread adding means operatively associated with the looper functioning in cooperation with the needle forming the straight stitch chain for increasing the quantity of looper thread in the sewing area and facilitate alignment of the stitch chains; and
(c) means for maintaining the aligned chains of stitches along the sewing axis of the overcast chain stitch for incorporat-

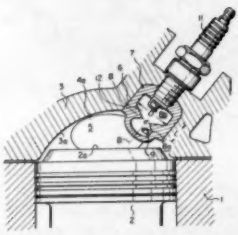
ing both chains in the initial stitches formed in the following workpiece.

4,175,501

INTERNAL COMBUSTION ENGINE WITH AN AUXILIARY COMBUSTION CHAMBER

Masaaki Noguchi, Nagoya; Shougo Sanda, Numazu, and Masaaki Takizawa, Mishima, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jul. 29, 1977, Ser. No. 820,248
Claims priority, application Japan, Jun. 1, 1977, 52-63169
Int. Cl.[2] F02B *19/08*
U.S. Cl. 123—30 D **6 Claims**



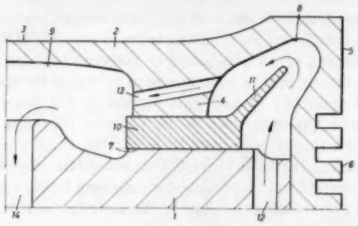
1. An internal combustion engine comprising:
a cylinder having a cylinder block and a cylinder head fixed onto said cylinder block;
a piston reciprocally movable in said cylinder block;
a main combustion chamber formed between a top surface of said piston and an inner surface of said cylinder head;
an intake valve movably mounted on the cylinder head for leading a combustible mixture into the main combustion chamber;
an exhaust valve movably mounted on the cylinder head for discharging an exhaust gas into the atmosphere;
means to supply fuel directly only to said main combustion chamber,
said cylinder head having therein an auxiliary combustion chamber extending symmetrically about an axis, said auxiliary combustion chamber having a circumferential inner wall including a raised annular portion defining a restricted opening interconnecting and of smaller diameter than a substantially spherically shaped first portion of said auxiliary combustion chamber located near the main combustion chamber and a second portion of said auxiliary combustion chamber located further from the main combustion chamber than the first portion, wherein said restricted opening is the only opening in said second portion of said auxiliary combustion chamber, the volume of said first portion of said auxiliary chamber is smaller than the volume of said second portion of said auxiliary chamber, the ratio of the diameter of said annular portion to the diameter of said second portion of said auxiliary chamber is less than 0.8, and the diameter of the second portion of the auxiliary chamber is greater than the axial length of said second portion,
a single passage means connecting the main combustion chamber and the auxiliary combustion chamber through the circumferential wall of said first portion of said auxiliary chamber, the inner end of said passage means being substantially tangentially disposed relative to the circumferential wall of said first portion of said auxiliary chamber and extending to the main combustion chamber so as to create a swirling motion of a combustible mixture in the first and second portions of said auxiliary combustion chamber, and
a spark plug having a spark gap located in the vicinity of said symmetrical axis and the second portion of said auxiliary combustion chamber, said restricted opening allowing the flow of a combustion gas from said second portion to said first portion, both of which portions are of greater diameter than the restricted opening, said combustion gas being collected in the vicinity of said symmetrical axis after said combustible mixture is ignited, while said restricted opening prevents outflow of unburned mixture from said second portion to said first portion, said unburned mixture being collected on the peripheral region in said second portion removed from said symmetrical axis due to the centrifugal force caused by said swirling motion of said combustible mixture, and
wherein said single passage means has an opening which is directed in a circumferential direction with respect to the inner wall of said main combustion chamber.

4,175,502

LIQUID-COOLED, ASSEMBLED PISTON FOR INTERNAL COMBUSTION ENGINES

Horst Moebus, Neckarsulm, Fed. Rep. of Germany, assignor to Karl Schmidt GmbH, Neckarsulm, Fed. Rep. of Germany

Filed May 22, 1978, Ser. No. 908,421
Claims priority, application Fed. Rep. of Germany, May 25, 1977, 2723619
Int. Cl.[2] F01P *3/10*
U.S. Cl. 123—41.35 **9 Claims**



1. In a liquid-cooled, assembled piston for an internal combustion engine of the type having a lower piston part, an upper piston part connected to the lower piston part, an annular cooling passage disposed in the upper piston part behind the top land and at least part of the ring-carrying portion thereof, an input coolant conduit in the lower piston part, a central cooling chamber disposed between the two piston parts, and a supporting ring concentrically disposed on the underside of the upper piston part and between the annular cooling passage and the central cooling chamber, wherein the improvement comprises: means providing communication between the annular cooling passage and the central cooling chamber, and oil-guiding means for effecting the flow of the oil along the periphery of the cooling passage as it enters same from the input coolant conduit, the liquid guiding means comprising an oil guiding ring including a flange gripped between the two piston parts and a lip connected to the flange and protruding into the annular cooling passage.

4,175,503

METHOD OF MAKING AIR ENGINE HOUSING

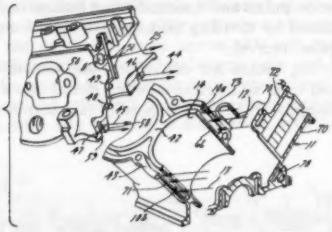
Robert P. Ernest, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 753,343, Dec. 22, 1976. This application Jun. 15, 1978, Ser. No. 915,857
Int. Cl.[2] F02F *1/14*
U.S. Cl. 123—41.72 **11 Claims**

1. An engine head for an internal combustion engine, comprising:
(a) an elongated housing comprised entirely of aluminum and having walls defining a top closure for a galley of aligned cylinders opening onto the bottom face of said housing, said housing having walls defining passages for inducting a combustible mixture and exhausting com-

busted gases, said closure walls extending upwardly from the bottom face of said housing,

(b) means defining a series of interconnected hemicylindrical grooves in said housing extending upwardly from the bottom face of said housing and consecutively along each of said cylinders, said grooves limiting the lower portion of said top closure walls to a thin-sectioned cylinder, said grooves being so interconnected as to leave a solid siamese connection between each of said thin-sectioned cylinders,



said grooves cooperating in forming two independent flow paths on opposite sides of a centerline extending between each of said cylinders, each of said flow paths extending transversely and consecutively from one cylinder to the next,

(c) means in said housing defining a third flow path arranged as a cylindrical boring located at the upper side of said housing spaced generally midway between said grooves, each of said three flow paths being commonly supplied with fluid from one end of said housing.

4,175,504

AIR INDUCTION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Georg Ederer, Munich; Adolf Fischer, Haar am Jagdfeld; Paul Rosche; Helmar Troll, both of Munich; Wolfgang Wurst, Dachau; Helmut Hengl, and Jiri Seidl, both of Munich, all of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke AG, Munich, Fed. Rep. of Germany

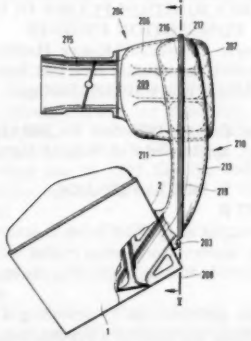
Division of Ser. No. 598,086, Jul. 22, 1975, Pat. No. 4,111,163.

This application Mar. 20, 1978, Ser. No. 888,262

Claims priority, application Fed. Rep. of Germany, Jan. 15, 1975, 2501305

Int. Cl.[2] F02B *75/18*

U.S. Cl. 123—52 M **8 Claims**



1. In combination, an internal combustion engine and an air induction system therefor, said air induction system comprising a distributor housing having an air inlet opening, and a plurality of induction passages having respective inlets whereby the interior of the distributor housing communicates with the interiors of the passages respectively and having respective oulets for connection to respective inlet ports of the engine, the internal cross section of each induction passage widening towards one or both ends thereof, said induction system being formed from a first pressure die cast part which defines a first portion of each induction passage and is formed integrally with flange means at the outlet ends of the induction passages for mounting said first part on a face of the engine, and a second part which defines a second portion of each induction passage and is joined to said first part in a plane which cuts lengthwise through the induction passages.

4,175,505

VALVE ROTATOR ASSEMBLY

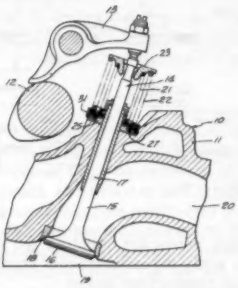
Shinichi Shimada, Kamifukuoka, and Takenori Makino, Okegawa, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1977, Ser. No. 847,231

Claims priority, application Japan, Nov. 11, 1976, 51/150610[U]; Dec. 2, 1976, 51/160476[U]

Int. Cl.[2] F01L *1/32*

U.S. Cl. 123—90.3 **1 Claim**



1. For use with a poppet valve assembly for a combustion chamber of an internal combustion engine, said assembly including a poppet valve having a stem, a pair of concentric coil compression springs encircling a portion of the stem and a retainer removably attached to the valve stem and contacted by the upper end of each spring, the improvement comprising, in combination: a stationary support member encircling the valve stem and having a concentric upward facing continuous groove therein, a garter spring in said groove and projecting slightly out of the groove, an annular rotator plate engaging said garter spring, and a retainer ring resting on said rotator plate and providing an upward facing shoulder for supporting the lower end of each of said coil springs at the same elevation, said retainer ring having integral fingers projecting therefrom contacting the outside of the outer coil spring and also having an inner cylindrical lip contacting the inside of the inner spring to hold these springs in concentric position.

4,175,506

ELECTRIC IGNITION CONTROL SYSTEM

Shinichi Sakamoto, and Takao Sasayama, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 10, 1977, Ser. No. 757,932

Claims priority, application Japan, Jan. 9, 1976, 51/1491

Int. Cl.[2] F02P *5/04*

U.S. Cl. 123—117 D **7 Claims**

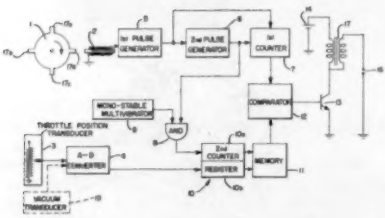
1. In an ignition control system comprising:

an ignition coil for producing high voltage so as to create an ignition spark in the gap of a spark plug;

switching means to produce or interrupt an energizing current through the ignition coil;

a memory for storing data relating to the ignition timing corresponding to at least one engine driven condition;

detecting means to detect an engine drive condition;
memory driving means responsive to the signals representing an engine drive condition from said detecting means for generating an address signal corresponding to such engine drive condition, said address signal being applied to said memory to read out selected ignition timing data;
means for detecting an instantaneous crankshaft position; and
comparator means for controlling said switching means so as to interrupt the energizing current of the ignition coil when the instantaneous crankshaft position becomes equal to the output of said memory;
the improvement characterized in that the instantaneous crankshaft position detecting means comprises
first pulse generator means for producing series reference pulses with a predetermined interval of the crankshaft revolution;
second pulse generator means for producing a predetermined number of crankshaft position pulses during the predetermined interval, said each pulse corresponding to a predetermined degree of the interval of the crankshaft revolution; and



first counting means for counting the crankshaft position pulses to apply the instantaneous crankshaft position signal to said comparator means;
said second pulse generating means including:
third pulse generating means for generating series pulses of a predetermined constant frequency which is higher than that of the reference pulses from the first pulse generator means and the crankshaft position pulses from the second pulse generator means;
second counting means having a counting cycle for counting a predetermined number of pulses, the second counting means outputting one pulse and being resumed itself to start count again when the predetermined number of the series pulse from the third pulse generating means has been received;
third counting means for counting the series pulses from the third pulse generating means, which has a reset terminal to clear the count of said third counting means to zero;
fourth counting means for counting the output of the second counting means; and
second comparator means for outputting pulses to the first counting means when the count of the third counting means reaches the output digital value of the fourth counting means.

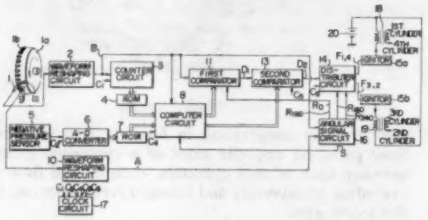
4,175,507

ELECTRONIC IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Hisasi Kawai, Toyohashi, and Kazuo Iwase, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Nov. 2, 1977, Ser. No. 847,815
Claims priority, application Japan, Dec. 17, 1976, 51/152567
Int. Cl.[2] F02P *1/00, 5/04*
U.S. Cl. 123—117 D **3 Claims**

1. An electronic ignition timing control system comprising:
rotation angle means for producing a train of rotation pulses each of which is indicative of a predetermined angular rotation of an output shaft of an engine;
reference angle means for producing a reference pulse indicative of a rotation of said output shaft of said engine to a predetermined reference angle;
clock means for producing a train of clock pulses at a fixed frequency;
computing means for computing a desired ignition retard angle in accordance with operating conditions of said engine, said first computing means producing a first output value indicative of a quotient obtained by dividing said ignition retard angle by an angular interval of each of said rotation pulses and a second value indicative of a residual obtained by dividing said ignition retard angle by said angular interval;
converting means for converting said second value produced from said first computing means into a retard time in response to a rotation speed of said output shaft of said



engine, said converting means producing a third value indicative of said retard time;
first comparison means for comparing a number of said rotation pulses produced after said reference pulse with said first value produced from said computing means, said first comparison means producing a first comparison output when said number of said rotation pulses reaches said first value;
second comparison means for comparing a number of said clock pulses produced after said first comparison output with said third value produced from said converting means, said second comparison means producing a second comparison output when said number of said clock pulses reaches said third value; and
ignition means for producing an ignition voltage in response to said second comparison output.

4,175,508

METHOD AND APPARATUS TO GENERATE A TRIGGER PULSE WITHIN A TIME RANGE, PARTICULARLY IGNITION PULSES IN INTERNAL COMBUSTION ENGINES

Jürgen Wesenmeyer, Nüremberg; Georg Haubner, Berg, and Werner Meier, Rednitzhembach, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 16, 1978, Ser. No. 869,616
Claims priority, application Fed. Rep. of Germany, Jan. 20, 1977, 2702208
Int. Cl.[2] F02P *5/04*
U.S. Cl. 123—117 R **14 Claims**

1. System to trigger an ignition pulse to determine the ignition instant in an internal combustion engine with respect to a reference position of the crankshaft of a piston thereof comprising
a marker pulse generator **(6, 7)** providing a marker pulse when the piston has reached a predetermined position;
a sequential pusle generator **(11, 12, 13)** providing a continuously occurring plurality of pulses during operation of the apparatus, a predetermined number of said pulses, upon occurrence of said marker pulse, forming a pulse train;
count and store circuit **(32)**;
condition signal generating means **(60, 65)** generating at least

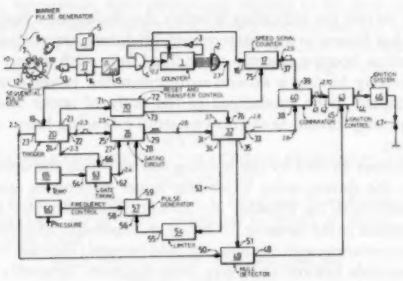
one engine operating signal representative of an operating or operation condition of the engine;

a pulse generator means (57) generating a sequence of pulses;

a gating circuit (26) connected to the condition signal generating means (60,65) and having the sequential pulses from the pulse generating means (57) applied thereto, and applying the pulses from said frequency generating means during the occurrence of said pulse train to the count and store circuit (32);

said count and store circuit alternately counting and storing the pulses applied by said gating circuit; and

a comparator (40) comparing the pulses stored in the memory of the count and store circuit (32) and the pulses derived from the sequential pulse generator and forming said pulse train, and providing said ignition signal when a predetermined relation between the pulses applied to the comparator exists, wherein, in accordance with the invention,



to generate said predetermined number of pulses forming said pulse train a counter means (1) is provided having said plurality of pulses from said sequential pulse generator (11, 12, 13) applied thereto,

the counter being further connected to said marker pulse generator to start counting said pulses from the sequential pulse generator (11, 12, 13) upon occurrence of the marker pulse; and

decode means (2, 3, 4) connected to a predetermined stage of the counter means (1) and deriving a pulse having a time length representative of rotation of the shaft of the engine through a predetermined angular range, including gating means (2) connected to at least one predetermined count output stage of the counter means (1) whereby stepping of the counter means in synchronism with the pulses and gating a counter means signal at a predetermined count stage will provide a time interval signal having a timing duration representative of said angular range of rotation.

4,175,509

MAGNETO IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Josef Orova, Schwabach, and Jiri Podrapsky, Buchschwabach, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 16, 1978, Ser. No. 869,617

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1977, 2601750

Int. Cl.[2] F02P *3/02*

U.S. Cl. 123—117 R **7 Claims**

1. In a magneto ignition system for an internal combustion engine having

a magnet (11) rotating with the engine;

a magneto armature (12) in magnetically coupled relation to the rotating magnet and having a primary coil (13*a*) connected to a primary circuit, and a secondary coil (13*b*) connected to a spark plug (15);

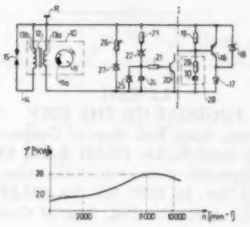
a semiconductor switch (16) having a control path (base-emitter) connected in the primary circuit;

a control circuit (20–25) connected to the control path of the semiconductor switch (16) and to the primary circuit of the ignition coil, including

means (22) sensing the voltage level across said primary circuit,

and connection means (20, 21) responsive to said voltage level connected to and controlling conduction and cut-off, respectively, of the semiconductor switch as a function of said voltage level to provide, upon conduction of the semiconductor switch, for current flow through the primary coil, and sudden interruption of current flow upon cut-off and to generate a spark in said spark plug at a predetermined angular position with respect to top dead center (TDC) position of a piston of the engine,

means to advance the spark upon increase of speed of the engine comprising



means (28, 29, 30) modifying the voltage level across said primary circuit as a function of increasing speed of the engine in a direction to cause response of said voltage level sensing means, and hence of said connection means to control said semiconductor switch (16) to cut off at an advanced angular position with respect to TDC position of a piston of the engine, said modifying means comprising a frequency responsive circuit (28, 29, 30) connected to the primary circuit and providing an output changing the voltage level in said primary circuit as a function of change of frequency of the current flow in the primary circuit upon change of speed of rotation of the magnet as the speed of the engine changes.

4,175,510

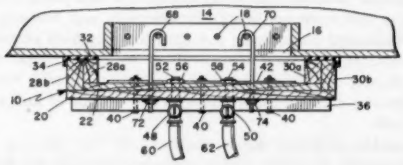
COFFERDAM

Thomas H. Devine, 147 Jefferson Ave., Chula Vista, Calif. 92012

Filed Oct. 25, 1977, Ser. No. 845,355

Int. Cl.[2] B63B *43/16*

U.S. Cl. 114—227 **11 Claims**



1. A cofferdam for closing off underwater openings in ships' hulls, comprising:

a first wall constructed of a plurality of sheets of marine plywood laminated together having a generally planar configuration defining a stepped portion extending around the perimeter thereof, and dimensioned to exceed the area of an opening to be covered in a ship's hull;

a second wall constructed of multiple wooden beams laminated together defining a step extending along the entire length of said second wall, said second wall extending

around the perimeter of, and at right angles to said first wall for engaging said ship's hull around said opening for spacing said first wall a predetermined distance from said ship's hull for defining a cavity therebetween;

said step and said stepped portion defining a stepped overlapping joint extending around the perimeter of and connecting said first wall and said second wall together at the intersection thereof;

seal means extending around the periphery of said second wall for sealing the engagement thereof with a ship's hull; and

mounting means for securing said cofferdam to a ship's hull for covering an opening therein.

4,175,511

TUGBOAT OR THE LIKE

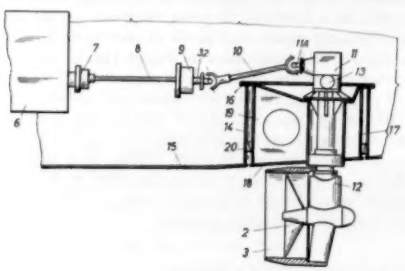
Franz Krautkremer, Spay, Fed. Rep. of Germany, assignor to Schottel-Werft Josef Becker GmbH & Co. KG, Rheinland, Fed. Rep. of Germany

Filed Nov. 16, 1977, Ser. No. 852,031

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1976, 2655667

Int. Cl.[2] B63H *5/12*

U.S. Cl. 115—35 **7 Claims**



1. A drivable propeller arrangement for a watercraft, comprising:

a watertight compartment formed in the lower hull of said watercraft and having a downwardly open port therefrom to below said watercraft, the upper end of said watertight compartment being positioned above the waterline on said watercraft;

a hollow housing removably mounted in said compartment, the maximum peripheral dimension of said housing in a horizontal plane being less than the minimum peripheral dimension of said compartment in a horizontal plane thereby defining a spacing therebetween, said housing having a lower wall flush with the surface of said lower hull;

steerable propeller means mounted on said housing, said steerable propeller means extending through the hollow part of said housing and through said lower wall and having a propeller means supported for rotation about a horizontal axis on a lower end thereof below said lower wall, the maximum peripheral dimension of said propeller means in a horizontal plane being less than said peripheral dimension of said compartment; and

support means for said housing including a laterally extending flange on said housing which rests on the upper end of said watertight compartment and plural thrust blocks received in said spacing to thereby stabilize said housing with said compartment.

4,175,512

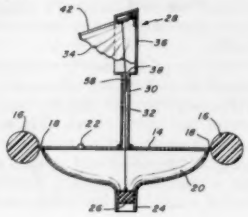
ICE THICKNESS INDICATOR

Douglas W. Iwanicki, 120 Lynnfield St., Peabody, Mass. 01960

Filed Aug. 3, 1978, Ser. No. 930,751

Int. Cl.[2] G01D *11/00*; G01K *11/06*

U.S. Cl. 116—217 **12 Claims**



1. A device for indicating whether the surface of a body of water has frozen to a predetermined thickness comprising:

a hollow housing adapted to be filled fully with water, said housing having a downwardly extending lower portion adapted to be submerged in the body of water and an opening formed in the downwardly extending lower portion;

a member carried by the housing and covering the opening in the downwardly extending lower portion in sealing relation to the housing, the member being movable with respect to the housing, to define an expansible chamber in cooperation with the housing, said movable member being movable toward and away from the more upwardly disposed portions of the housing;

means for supporting said housing so that predetermined portion thereof is disposed at reference surface said movable member is disposed at a predetermined depth below the surface of the body of water;

said movable member being movable downwardly in response to expansion of water within the housing as the water in the housing freezes;

indicator means carried by the housing at a location above the level of the housing; and

means connecting the indicator means to said movable member to enable the indicator means to provide an indication of the position of the movable member and, thereby an indication of the thickness of the ice at the surface of the body of water.

4,175,513

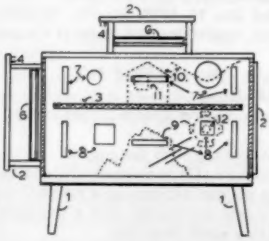
QUICK STEP ECOLARIUM

Otto A. Roehrick, 1333 Elkhorn Blvd., Rio Linda, Calif. 95673

Filed Oct. 4, 1976, Ser. No. 729,306

Int. Cl.[2] A01K *64/00*

U.S. Cl. 119—5 **11 Claims**



1. For an ecology tank system comprising a lower aquarium compartment and a terrarium upper compartment, said com-

partments being separated by a shelf or platform horizontally disposed therebetween, in combination:

(A) means for supporting said tank and controlling the light to said tank for illuminating ornamentation and algae control, the combination comprising a stand, a vertical light chamber rising upward from the back of said stand having an external shape corresponding to the external shape and size of said ecology tank, said light chamber having an opaque back wall, opaque bottom member with end and top members having apertures therein for receiving light drawers, the front wall of said light chamber having light dispensing apertures of predetermined size and shape and locations, said light chamber containing an electrical circuit with a female outlet at each drawer opening and at least one additional outlet,

(B) light drawers extending the light bulbs inward from the side and top walls to a predetermined location said light drawers having the male connector for engaging said light when the drawer is closed,

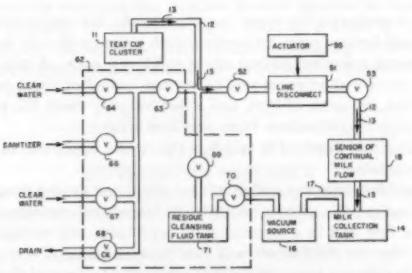
(C) ornamental light dispensing objects to be used on the inside of said ecology tank having bottom and top walls a front wall, side walls, and no back wall, the front and side walls having at least one ornamental light dispensing aperture.

4,175,514

AUTOMATIC MILKING MACHINE CONTROL AND CLEANSING

Frank F. Souza, Hilmar; Vernon A. Silva, and Tony Cabral, both of Turlock, all of Calif., assignors to Frank F. Souza, Inc., Turlock, Calif.

Filed May 19, 1977, Ser. No. 798,292
Int. Cl.[2] A01J *7/00*
U.S. Cl. 119—14.08 **7 Claims**



1. In automatic apparatus for successively milking a plurality of cows with a cow milking teat cup cluster and for internally cleansing the teat cup cluster between the milking of successive cows therewith, comprising the combination of:

means normally communicating said teat cup cluster with a milk receptacle for the flow of milk therebetween;

means to control milking a cow with said teat cup cluster;

means to prevent operation of said means to control milking a cow, during internal cleansing of said teat cup cluster;

means to interrupt fluid communication of said cluster with said milk receptacle, during internal cleansing of said cup cluster;

means to pass cleansing fluid through said cluster; and

means to control operation of said fluid communication interrupting means and said cleansing fluid passing means, which control means directs said cleansing fluid passing means to pass said cleansing fluid through said cluster only when fluid communication of said cluster with said milk receptacle is interrupted;

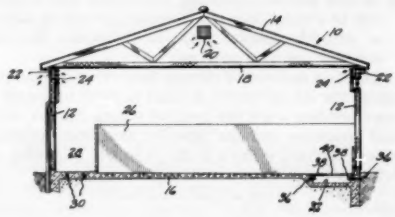
said means to interrupt said fluid communication of said cluster with said milk receptacle including means both to disconnect fluid communication between and to physically separate and space away from one another in a direction having a directional component extending along the path of normal fluid communication therebetween, the fluid communicating parts of a pair of adjacent flow components providing a continuous flow path therebetween for milk.

4,175,515

SANITARY UNIT FOR CONFINED ENVIRONMENTAL CONTROLLED FEEDING OF HOGS

Kenneth M. Bradley, Rte. 5, Meadow Brook, Dowagiac, Mich. 49047

Filed Dec. 5, 1977, Ser. No. 857,295
Int. Cl.[2] A01K *1/00, 1/01*
U.S. Cl. 119—16 **8 Claims**



1. In a sanitary unit for confined environmental controlled feeding of hogs,

a building having walls, a roof and a floor,

means in said building forming a plurality of pens for confining hogs,

means in each pen providing feeding and watering stations for hogs,

means controlling the environment and temperature in said building,

the floor of said building including an elongated trough extending through each pen spaced from said feeding and watering stations, said trough having a bottom inclined longitudianlly to a discharge outlet,

a multi-section removable grill covering said trough, and

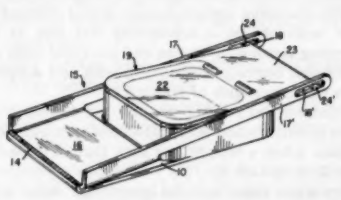
means for periodically directing and discharging jets of water at a pressure in the order of 50 psi or more diagonally into said trough below said grill at points spaced apart in the order of 4 ft. along the length of and at each side of the trough.

4,175,516

PET FEEDING DEVICE

Richard T. Savage, Greenlake Ave., Leeds, N.Y. 12451

Filed Sep. 28, 1977, Ser. No. 837,609
Int. Cl.[2] A01K *1/10*
U.S. Cl. 119—62 **1 Claim**



1. A pet-operated closeable feeding device comprising:

(a) a frame;

(b) an open food receptacle in fixed position on and integral with said frame and having forward and rearward edge portions;

(c) an actuator unit pivotably mounted on said frame for-

ward of the forward edge portion of said food receptacle comprising:

i. a flat pedal portion disposed between the pivotable mounting of the actuator unit and the forward edge portion of said food receptacle, and

ii. a pair of parallel arm portions extending from said pedal portion rearwardly to each side of and beyond the rearward edge portion of said food receptacle, each of said arm portions being formed with a longitudinal slot; and

(d) a lid unit pivotably hinged to said frame adjacent the rearward edge portion of said food receptacle and comprising:

i. a transparent flat cover portion adapted to overlie and enclose said food receptacle when said lid unit is in said closed position, and

ii. an end portion extending rearwardly and including a pair of coaxial opposed trunnions extending outwardly in slideable contact with the respective slots in the actuator unit arm portions;

(e) whereby a downward turning force on said pedal portion causes the lid unit cover portion to pivot upwardly to an open position while the point of sliding contact of the lid unit trunnions and the actuator unit arm portion slots moves forwardly toward the pivotable mounting of the actuator unit.

4,175,517

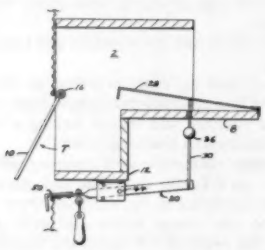
CAT PROOF PIGEON TRAP

Doyle G. Kilgore, 1303 Gober St., Houston, Tex. 77017

Filed Aug. 1, 1978, Ser. No. 929,934

Int. Cl.[2] A01K *29/00*

U.S. Cl. 119—155 **4 Claims**



1. A pigeon trap comprising a walkway divided into an outer walkway having an outer end open to the atmosphere and an inner walkway having an inner end open to an aviary except for the usual bobs pivotally suspended from a horizontal pin disposed above such inner end, such bobs normally hanging approximately vertically and having free lower ends,

a balance beam extending below both said walkways and pivotally mounted proximate its midpoint with an outwardly extending portion having its end connected to said outer walkway by a connecting rod and its inwardly extending portion having an end provided with a number of through openings registering with and adapted to receive the lower ends of said bobs,

said outer walkway being pivoted and having a normally raised position when no weight rests on it and a depressed position when a weight less than that of the average pigeon does rest on it,

whereby when there is no weight on the outer walkway it assumes its raised position and it acts on said balance beam through the connecting rod to raise the outer end of the beam and depress the inner end of the beam to keep such inner end spaced away from the lower ends of the bobs and allow a pigeon standing on the inner walkway to push the bobs out of its way so that it can pass by them into the aviary, and when a pigeon or other animal rests a portion of its weight on the outer walkway, such outer walkway assumes its depressed position and rotates the balance beam so that its outer end is depressed and its inner end is raised to engage said lower ends of the bobs and lock said bobs against rotation.

4,175,518

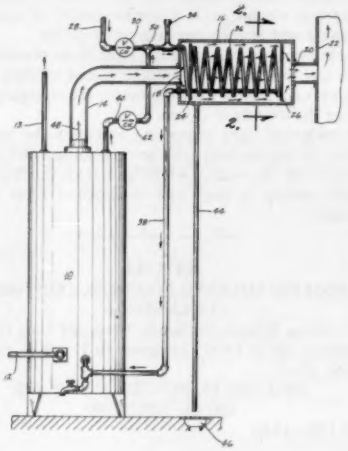
PREHEATER DEVICE FOR HOT WATER HEATERS

Cedric (Ted) A. Reames, Jr., R.R. #2, Adel, Iowa 50003

Filed Feb. 21, 1978, Ser. No. 879,063

Int. Cl.[2] F22B *1/18;* **F22D** *1/00*

U.S. Cl. 122—20 B **9 Claims**



1. A preheater for water heaters and the like comprising:

a cold water line in connection with a source of cold water;

a water container having upper and lower ends, an inlet line connected adjacent said lower end and a hot water outlet line, a source of heat, and a flue to carry away the products of combustion from said heat source;

a manifold imposed in said flue above said upper end of said container,

a coil line imposed within said manifold and having a second end in connection with said inlet line of said container, and a first end in communication with said cold water line, whereby cold water will pass through said coil line prior to entering said container adjacent said lower end thereof;

a recirculating line connected adjacent said upper end of said container and in connection with said cold water line upstream of said coil;

a first check valve means in said recirculation line above said container to permit flow of water from said recirculating line only in a direction away from said container, and

a second check valve means in said cold water line upstream from said manifold and said recirculating line to permit cold water to flow only towards said manifold and to prevent water from said recirculating line from entering said cold water line.

4,175,519

VAPOR GENERATOR UTILIZING VERTICAL BARS FOR SUPPORTING ANGULARLY ARRANGED FURNACE BOUNDARY WALL FLUID FLOW TUBES

Harry H. Pratt, West Orange, and Dudley P. Money, Parsippany, both of N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

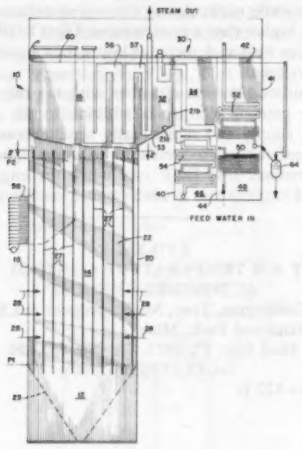
Filed Mar. 31, 1978, Ser. No. 892,061

Int. Cl.[2] F22B *37/24*

U.S. Cl. 122—510 **10 Claims**

1. A vapor generator comprising an upright furnace section

the boundary walls of which are formed by a plurality of tubes, and means for passing fluid through said tubes to apply heat to said fluid; one portion of each of said walls being formed by tubes extending at an acute angle with respect to a horizontal plane and another portion of each of said walls being formed by tubes extending substantially vertically, and a plurality of substantially vertically extending support bars disposed at spaced intervals across said boundary walls and connected



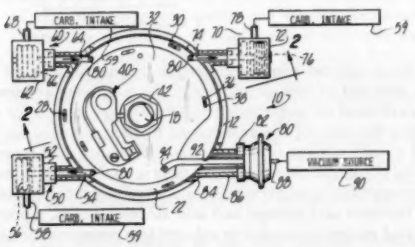
along their lengths to said tubes along both portions of said walls for supporting said tubes, the portion of each support bar connected to said angularly extending tubes having a series of substantially semi-circular notches formed therein for receiving a plurality of said latter tubes and the portion of each support bar connected to said vertically extending tubes having an elongated notch formed therein for receiving one of said latter tubes.

4,175,520

DISTRIBUTOR ASSEMBLY

Albert C. Russell, deceased, late of Belleair, Fla., and Mary K. Russell, administratrix, One Eastwood La., Belleair, Fla. 33516

Filed Jan. 16, 1978, Ser. No. 869,524
Int. Cl.[2] F02P *5/04*
U.S. Cl. 123—117 A **8 Claims**



1. A distributor assembly for use with an internal combustion engine, said distributor assembly comprising:

a distributor housing,

a first distributor plate and means for rotatably mounting said first plate in the housing between a first and second rotational position,

a second distributor plate and means for coaxially rotatably mounting said second plate onto said first plate between a first and second rotational positon,

switch means mounted to said second plate,

a distributor shaft rotatably mounted through said housing and coaxially through said plates and means connected to said shaft for selectively actuating said switch means upon rotation of said shaft,

means for controlling the rotational position of one of said plates in response to the manifold vacuum of said engine, and

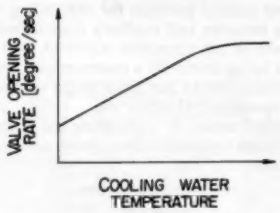
means for controlling the rotational position of the other plate in response to the temperature and pressure of an air source.

4,175,521

AIR-FUEL RATIO ADJUSTING SYSTEM

Tadashi Hattori, Okazaki; Akira Takata; Tamotsu Fukuda, both of Toyota, and Takamichi Nakase, Gamagori, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Mar. 30, 1977, Ser. No. 782,733
Claims priority, application Japan, Apr. 14, 1976, 51-42697
Int. Cl.[2] F01N *3/15;* **F02M** *37/00*
U.S. Cl. 123—119 D **9 Claims**



1. An air-fuel ratio adjusting system for an internal combustion engine which includes main air supply means having a throttle valve therein, for producing air-fuel mixture to be supplied to the engine, and an exhaust system for emitting exhaust gases, comprising:

an air-fuel ratio sensor disposed in the exhaust system, for sensing the air-fuel ratio of the mixture from oxygen content of the exhaust gases;

additional air supply means including a bypass valve, for supplying additional air into the main air supply means on a downstream side of the throttle valve, the amount of the additional air corresponding to the degree of opening of the bypass valve;

bypass valve driving means connected to said bypass valve for moving said bypass valve;

an engine warm-up condition sensor for sensing the warm-up condition of the engine to produce an engine condition signal; and

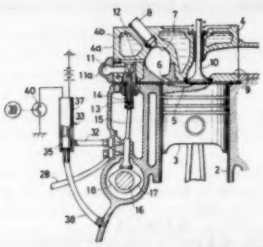
a control unit connected to said air-fuel ratio sensor, said bypass valve driving means, and said engine warm-up condition sensor, for controlling said bypass valve driving means to move said bypass valve at a speed which varies with the engine condition signal, and in a direction of maintaining the air-fuel ratio of the mixture at a target value, the moving speed of said bypass valve in a leaner direction being varied to decrease said target value until said air-fuel ratio sensor has been activated completely.

4,175,522

EXHAUST GAS RECIRCULATION DEVICE FOR INTERNAL COMBUSTION ENGINE WITH AUXILIARY COMBUSTION CHAMBER

Hideo Kawamura, Yamato; Hideo Ohta, Kohza, and Kimi Kubota, Chigasaki, all of Japan, assignors to Isuzu Motors Limited, Kawasaki, Japan

Filed Jan. 16, 1978, Ser. No. 869,962
Claims priority, application Japan, Jan. 24, 1977, 52/6652
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **4 Claims**



1. In a multicylinder, four cycle compression ignition internal combustion engine of the type employing auxiliary combustion chambers in which fuel is injected in timed sequence, an exhaust gas recirculating device comprising:

an exhaust gas expansion manifold communicating with each of said auxiliary combustion chambers through separate exhaust passages,

a plurality of cam operated valves, one located in each of said separate exhaust passages for controlling the flow of exhaust gas between said auxiliary combustion chambers and said exhaust gas expansion manifold, said cam operated valves being driven by a common cam shaft to open in the expansion stroke and again in the suction stroke of their corresponding cylinders, and

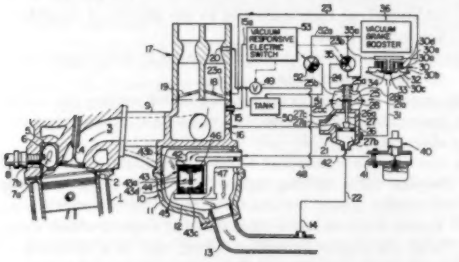
hydraulic control means for preventing the opening of said plurality of cam operated valves under condition of high load operation.

4,175,523

INTERNAL COMBUSTION ENGINE AND A METHOD FOR OPERATION THEREOF

Masaaki Noguchi, Nagoya; Masaharu Sumiyoshi, Toyota; Tsuchio Bunda, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Mar. 27, 1978, Ser. No. 890,901
Claims priority, application Japan, Mar. 29, 1977, 52-35008
Int. Cl.[2] F02M *25/06;* **F02B** *43/08*
U.S. Cl. 123—119 A **18 Claims**



1. A method of operating an internal combustion engine of the type that comprises a combustion chamber, an intake system having a fuel circuit for feeding a mixture of air and gasoline into said combustion chamber, an ignition system, an exhaust system, an EGR system for recirculating a part of the engine exhaust gases from the exhaust system back into said intake system, and a fuel reforming system for converting a mixture of air and a fuel into a reformed combustible gaseous mixture rich with free hydrogen, said method comprising the steps of:

detecting the load on the engine;

supplying said combustion chamber with the air-gasoline mixture while recirculating the engine exhaust gases at a rate not higher than a predetermined first EGR rate when the engine load as detected is lower than a predetermined load level; and

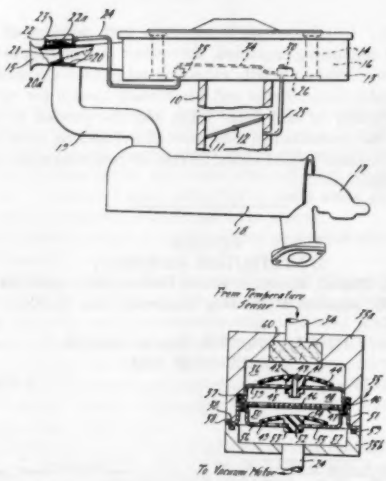
feeding said combustion chamber with the reformed combustible gaseous mixture in addition to the air-gasoline mixture supply and substantially simultaneously increasing the exhaust gas recirculation to a rate higher than said predetermined first EGR rate when the engine load as detected exceeds said predetermined load level.

4,175,524

INLET AIR TEMPERATURE CONTROL FOR AUTOMOBILE ENGINE

Thomas T. Coddington, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 17, 1977, Ser. No. 852,424
Int. Cl.[2] F02M *31/00*
U.S. Cl. 123—122 D **12 Claims**



1. In an internal combustion engine having an inlet air passage, first and second air inlet means for supplying ambient air and preheated air respectively to said passage, means for controlling the ratio of the ambient air to the preheated air supplied to said passage from said first and second inlet means to control the temperature of the air flow in said passage comprising proportioning valve means for controlling the communication between said passage and said air inlet means, a pressure actuated motor responsive to sub-ambient pressures for urging said proportioning valve means to decrease said ratio, temperature actuated means responsive to temperatures related to engine operation for modulating a pressure related to engine operation to effect a modulated motor actuating pressure comprising a function of the last named temperatures, and conduit means for applying the modulated pressure to said motor, the combination of check valve means for restricting the rate of fluid flow in said conduit means in one direction to said motor

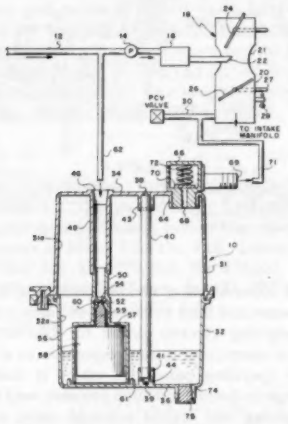
and for enabling fluid flow in said conduit means freely in the reverse direction from said motor, and second temperature actuated means responsive to temperatures related to engine operation and below a predetermined value for blocking said restricted fluid flow in said conduit means in said one direction to said motor.

4,175,525

FUEL VAPORIZER SYSTEM FOR INTERNAL COMBUSTION ENGINES

Edward E. Johnson, Richardson, Tex., assignor to Auto-Miser International Manufacturing Corp., Fort Worth, Tex.

Filed Apr. 8, 1977, Ser. No. 785,750
Int. Cl.[2] F02P 5/04; A61M 15/00
U.S. Cl. 123—134 **7 Claims**



1. A fuel distribution system comprising:

(a) a carburetor including a throttle valve and connected to the intake manifold of an internal combustion engine;

(b) fuel supply means for supplying fuel to said carburetor including a fuel reservoir, a pump, a first fuel line connecting said reservoir and said pump and a second fuel line connecting said pump and said carburetor;

(c) conduit means connected between said intake manifold downstream from said throttle valve and a PCV valve;

(d) a fuel vaporizer having fuel inlet means, air inlet means and outlet means, said vaporizer comprising:

(i) a top wall, a bottom wall and side walls defining a sealed enclosure;

(ii) a fuel conduit depending internally from the top wall of said enclosure, the lower end of said fuel conduit containing an orifice defining a valve seat, said valve seat being positioned substantially equidistant from said top and bottom walls and a substantial distance from any side wall, the upper end of said fuel conduit communicating with said fuel inlet means;

(iii) float means supporting a needle valve aligned with and adapted for mating with said valve seat and preventing fuel flow therethrough when a predetermined fuel level is contained in the lower portion of said enclosure;

(iv) cage means affixed to said fuel conduit defining a housing coaxial with said valve seat surrounding the vertical sides of said float means and extending below said predetermined fuel level, thereby preventing lateral movement of said float means with respect to said valve seat and damping vertical movement of said float means;

(v) an upstanding boss extending from said bottom wall spaced from and completely surrounding the lower end of said cage means to prevent air bubbles from entering said cage means;

(vi) air conduit means for conducting air from said air inlet means to a point below said predetermined fuel level; and

(vii) check valve means controlling fluid flow through said outlet means, said check valve means preventing fluid flow into said enclosure through said outlet means and permitting fluid flow from said enclosure through said outlet means only when there is a predetermined pressure differential across said check valve means;

(e) first conduit means for conducting fuel from said first fuel line to said fuel inlet means; and

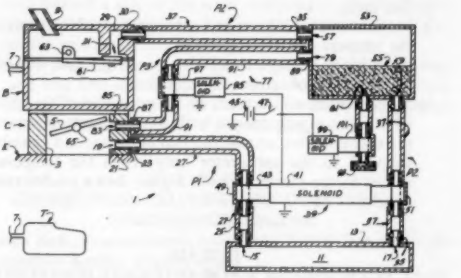
(f) second conduit means for conducting fluid from said check valve into said conduit means connected between said intake manifold downstream from said throttle valve and said PCV valve.

4,175,526

APPARATUS FOR VENTING FUEL VAPORS FROM A CARBURETOR FUEL BOWL

Michael B. Phelan, Florissant, Mo., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Nov. 7, 1977, Ser. No. 848,986
Int. Cl.[2] F02M 59/42
U.S. Cl. 123—136 **9 Claims**



1. Apparatus for venting fuel vapors present in the fuel bowl of a carburetor for an internal combustion engine, said carburetor having a passage through which air is drawn into the engine and a throttle valve positioned in the passage and movable between an open and a closed position to control the flow of air therethrough, the apparatus comprising:

an evacuable chamber;

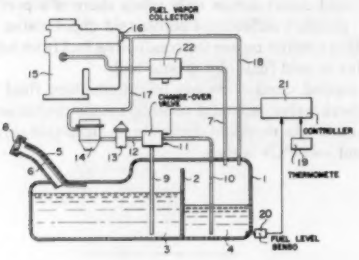
a first fluid flow path extending between said air passage and said chamber and a second fluid flow path extending between said chamber and said fuel bowl, said second fluid flow path having means positioned therein for adsorbing fuel vapors drawn from said fuel bowl; and

control means responsive to the operation of said engine for unblocking said first fluid flow path and blocking said second fluid flow path when said engine is running whereby said chamber is evacuated and a vacuum is created therein and for blocking said first fluid flow path and unblocking said second fluid flow path when said engine is not running whereby fuel vapors in said fuel bowl are drawn off to the chamber by the vacuum created therein thereby venting the fuel bowl.

4,175,527
FUEL SUPPLY SYSTEM FOR ENGINES

Masakatsu Sanada; Toshimitsu Ito, both of Toyota, and Masahiko Nakada, Okazaki, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jun. 24, 1977, Ser. No. 809,759
Claims priority, application Japan, Mar. 22, 1977, 52/31357
Int. Cl.[2] F02M *59/00*
U.S. Cl. 123—136 **8 Claims**



1. A fuel supply system, for an internal combustion engine equipped with a carburetor, comprising:

a fuel tank which comprises a fuel supply port, a first chamber which receives fuel supplied into the fuel supply port, and a second chamber;

a fuel supply passage means, which supplies fuel from the fuel tank to the carburetor, and which incorporates a fuel pump and a change-over valve which changes over connection of the fuel supply passage means between the first and the second chamber of the fuel tank;

a fuel return passage means, which returns excess fuel supplied to the carburetor back to the second chamber of the fuel tank;

a thermometer which senses a temperature which represents the temperature of the fuel;

a vapor bleed passage means for bleeding vapor out of the upper region of the second chamber;

and a controller which controls the operation of the change-over valve in accordance with the temperature sensed by the thermometer, so that the fuel in the second chamber is supplied to the carburetor only when the temperature sensed by the thermometer is higher than a predetermined value.

4,175,528
FUEL SUPPLY DEVICE FOR INTERNAL COMBUSTION ENGINE

André L. Mennesson, Neuilly-sur-Seine, France, assignor to Societe Industrielle de Brevets et d'Etudes S.I.B.E., Neuilly sur Seine, France

Filed Sep. 17, 1976, Ser. No. 724,363
Claims priority, application France, Sep. 30, 1975, 75 29916
Int. Cl.[2] F02M *39/00*
U.S. Cl. 123—139 AW **7 Claims**

1. A fuel supplying device for an internal combustion engine comprising:

an intake pipe,

operator actuatable main throttle means in said pipe,

auxiliary throttle means located in said intake pipe upstream of said main throttle means, said auxiliary throttle means automatically and progressively opening in proportion to the increase in the flow rate of air in said intake pipe,

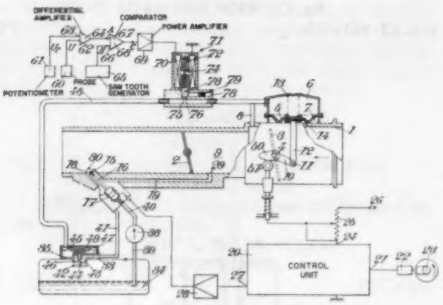
a source of fuel under pressure having a delivery circuit which opens into a portion of the intake pipe downstream of the main throttle means,

first solenoid valve means controlling the flow of fuel in said delivery circuit,

a metering system which is responsive to the degree of opening of the auxiliary throttle means having means delivering repeating pulse signals and arranged to supply said first solenoid valve means with at least one energization signal per pulse signal repetition period, said energization signal being applied for a fraction of the repetition period which depends on said degree of opening, and

pressure regulator means with said delivery circuit and including

a relief valve having a closure member, said relief valve being subjected to an opening force by the fuel pressure in said delivery circuit and subjected to a closure force by the vacuum in a control chamber connected by connecting duct means to that portion of the intake pipe between the two throttle means,



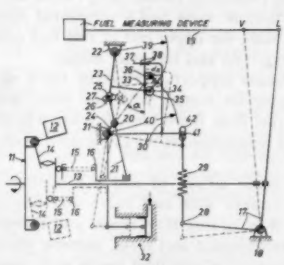
second solenoid valve means controlling communication between said duct means and the atmosphere, and

an energizing electric circuit for said second solenoid valve comprising means responsive to at least one engine operating parameter which is modified upon a change in the fuel injection pressure, said electric circuit supplying said second solenoid valve with repetitive excitation signals having a duration which varies in dependence on said parameter, the total time during which the second solenoid valve means is fully open during a predetermined time period depending upon the value of said parameter.

4,175,529
REGULATING DEVICE

Salahaddin Geafer, Markdorf, and Gerhard Zbikowski, Salem, both of Fed. Rep. of Germany, assignors to Motoren- und Turbinen-Union Friedrichafen GmbH, Fed. Rep. of Germany

Filed Jul. 6, 1977, Ser. No. 813,300
Claims priority, application Fed. Rep. of Germany, Jul. 13, 1976, 2631381
Int. Cl.[2] F02D *1/04*
U.S. Cl. 123—140 R **17 Claims**



1. Regulating arrangement for an internal combustion engine, the arrangement comprising a centrifugal governor means having a governor spring, a first linkage means for

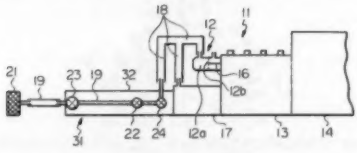
altering a pretension of the governor spring, means for coupling the centrifugal governor with a fuel measuring device, said coupling means being mounted so as to be displaceable by said centrifugal governor means, restoring linkage means operatively connected with the coupling means for changing the position of said first linkage means in dependence upon the displacement of the coupling means, an adjustable control means for controlling a positioning of one of said linkage means, means for mounting said control means so as to be pivotable about a first pivot axis for adjustment thereof and for connecting said control means with said one of said linkage means, a moving element operatively cooperating with said control means, means defining a second pivot axis for connecting said moving element with the other of said linkage means such that the moving element is pivotable about a second pivot axis, said control means and said moving element being arranged between said first linkage means and said restoring linkage means, and means provided on at least one of the linkage means for enabling a selective adjustment of at least one of the pivot axis of said control means and the pivot axis of the moving element so that the first and second pivot axes may be selectively adjusted so as to be coaxial with respect to one another in every position of the coupling means.

4,175,530

PNEUMATIC GOVERNOR CONTROL APPARATUS FOR ENGINE FUEL INJECTION SYSTEM

Eijiro Asano, and Ryuichi Komori, both of Higashi-Matsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jan. 19, 1978, Ser. No. 870,661
Claims priority, application Japan, Jan. 21, 1977, 52-6140[U]
Int. Cl.[2] F02D *1/04*
U.S. Cl. 123—140 FG **10 Claims**



1. In a fuel injection system for an internal combustion engine having a pneumatic governor which varies an amount of fuel injection in accordance with air pressure applied to the governor, a control apparatus comprising:
- an engine driven air pump producing an output air pressure corresponding to engine speed;
- a first passageway connecting the air pump to the governor;
- a second passageway connecting the first passageway to the atmosphere; and
- a variable control valve provided in the second passageway.

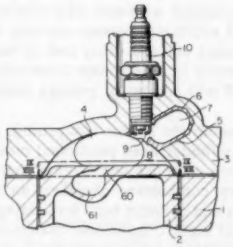
4,175,531

INTERNAL COMBUSTION ENGINE WITH AN AUXILIARY COMBUSTION CHAMBER

Toshio Tanahashi, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 25, 1977, Ser. No. 781,423
Claims priority, application Japan, Apr. 12, 1976, 51-40405
Int. Cl.[2] F02B *19/00*
U.S. Cl. 123—191 S **6 Claims**

1. An internal combustion engine comprising:
- a cylinder block having a cylinder bore therein;
- a cylinder head on said cylinder block;
- a piston reciprocally movable in said cylinder bore, said piston and said cylinder head defining a large main combustion chamber therebetwen when said piston is in its top dead center position;
- an intake valve movably mounted on said cylinder head through which a combustible mixture is fed into said main combustion chamber;
- an exhaust valve movably mounted on said cylinder head through which exhaust gas is discharged from said main combustion chamber;
- means defining a first auxiliary combustion chamber in said cylinder head;
- a first passage directly fluidly communicating said first auxiliary combustion chamber and said main combustion chamber, said first passage extending obliquely relative to the axis of said piston is a direction downward and toward one side of the main combustion chamber;
- means defining a second auxiliary combustion chamber in said piston;



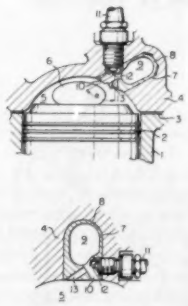
- a single second passage in said piston directly fluidly communicating said second auxiliary combustion chamber and said main combustion chamber, said second passage opening into said main combustion chamber at a position near the position at which the first passage opens into said main combustion chamber, said second passage also extending obliquely to the axis of the piston in a direction upward and toward a side of the main combustion chamber opposite said one side and having an axis substantially parallel to the axis of the first passage; and
- a spark plug having a spark gap in one of said first passage and said first auxiliary combustion chamber, said second passage and said second auxiliary combustion chamber not having a spark gap of a spark plug therein.

4,175,532

COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE

Takashi Kato, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 23, 1978, Ser. No. 889,874
Int. Cl.[2] F02B *19/16*
U.S. Cl. 123—191 S **8 Claims**



1. An internal combustion engine comprising: a main combustion chamber; a cylinder head positioned over one end of said main combustion chamber and having therein a cavity

defining an auxiliary combustion chamber; an intake valve movably mounted in said cylinder head for leading a combustible mixture into said main combustion chamber; an exhaust valve movably mounted in said cylinder head for discharging exhaust gas into the atmosphere; a substantially straight connecting passage in said cylinder head and directly fluidly communicating said main combustion chamber with said auxiliary combustion chamber for leading the combustible mixture in said main combustion chamber into said auxiliary combustion chamber at the time of the compression stroke, one end of said connecting passing opening directly into said main combustion chamber and the other end of said connecting passage opening directly into said auxiliary combustion chamber; a spark plug having a spark gap in said connecting passage; an additional passage in said cylinder head and directly fluidly communicating said connecting passage with said main combustion chamber, one end of said additional passage opening directly into said connecting passage and the other end of said additional passage opening directly into said main combustion chamber, and said one end of said additional passage pointing toward said spark gap.

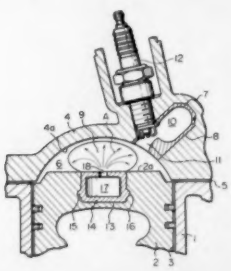
5. An internal combustion engine comprising: a main combustion chamber; a cylinder head positioned over one end of said main combustion chamber and having therein a cavity defining an auxiliary combustion chamber; an intake valve movably mounted in said cylinder head for leading a combustible mixture into said main combustion chamber; an exhaust valve movably mounted in said cylinder head for discharging exhaust gas into the atmosphere; a substantially straight connecting passage in said cylinder head and directly fluidly communicating said main combustion chamber with said auxiliary combustion chamber for leading the combustible mixture in said main combustion chamber into said auxiliary combustion chamber at the time of the compression stroke, one end of said connecting passage opening directly into said main combustion chamber and the other end of said connecting passage opening directly into said auxiliary combustion chamber, a spark plug having a spark gap in said connecting passage; an additional passage in said cylinder head and directly fluidly communicating said connecting passage with said main combustion chamber, one end of said additional opening directly into said connecting passage in a region thereof closer to the main combustion chamber than the spark gap and the other end of said additional passage opening directly into said main combustion chamber.

4,175,533

INTERNAL COMBUSTION ENGINE WITH AN AUXILIARY COMBUSTION CHAMBER

Kenji Goto; Masato Yokota, and Hideo Kobayashi, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 4, 1977, Ser. No. 848,759
Claims priority, application Japan, May 20, 1977, 52-57559
Int. Cl.[2] F02B *23/00*
U.S. Cl. 123—191 S **8 Claims**



1. An internal combustion engine comprising:

a cylinder block having a cylinder bore therein;

a cylinder head mounted on said cylinder block and having therein a cavity for defining a first auxiliary combustion chamber;

a piston reciprocally moving in said cylinder bore and having a top face, said piston and said cylinder head forming a main combustion chamber therebetween;

at least one connecting passage communicating said main combustion chamber with said first auxiliary combustion chamber and having an opening which is arranged to be directed to the central portion of the top face of said piston when said piston reaches the top dead center;

an intake valve mounted on said cylinder head for leading a combustible mixture into said main combustion chamber;

an exhaust valve mounted on said cylinder head for discharging an exhaust gas into the atmosphere;

an ignition means for igniting the combustible mixture in said first auxiliary combustion chamber;

a second auxiliary combustion chamber formed in said piston, and;

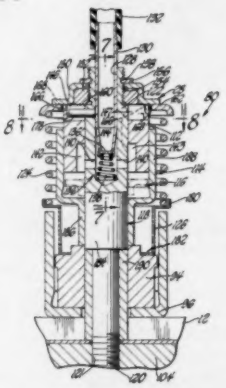
a connecting means communicating said main combustion chamber with said second auxiliary combustion chamber and having at least one opening which opens onto the central portion of the top face of said piston.

4,175,534

VALVE DEACTIVATOR FOR INTERNAL COMBUSTION ENGINES

Edgar R Jordan, 32260 W. 12 Mile Rd., Farmington, Mich. 48018

Filed Jul. 14, 1977, Ser. No. 815,743
Int. Cl.[2] F02D *13/06*
U.S. Cl. 123—198 F **4 Claims**



1. An internal combustion engine cylinder valve deactivator comprising: first and second cylindrical members sealingly slidable in an axial relationship with each other to define a cavity therebetween of a volume that varies upon relative axial sliding between the members; an elongated support having an inner end mountable on an engine and an outer end extending axially through the cylindrical members to axially fix the first cylindrical member relative to the engine while permitting rotation thereof; said second cylindrical member being located between the engine and the first cylindrical member for movement toward and away from the engine; a bearing movable toward the engine with the second cylindrical member; a rocker arm including an intermediate portion mounted by the bearing and having push rod and valve actuating ends on opposite sides of the bearing; an inlet passage for feeding pressurized fluid to the cavity in a first rotational position of the first cylindrical member to move the second cylindrical member axially toward the engine so that the rocker arm is positioned by the bearing to actuate an associated engine cylinder

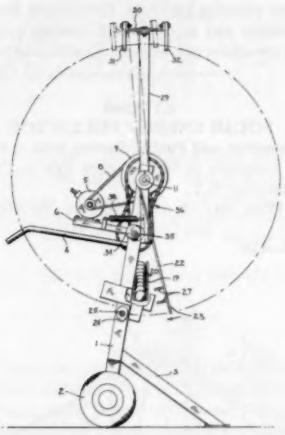
valve; an exhaust passage for exhausting the pressurized fluid from the cavity in a second rotational position of the first cylindrical member so that the second cylindrical member is movable away from the engine block to deactivate the valve operation; and a helical spring that encircles the first and second cylindrical members and includes a first end axially fixed with respect to the support and also includes a second end seated by the bearing so as to bias the bearing and rocker arm toward the engine to thereby provide lash takeup of the bearing and rocker arm when the cavity is exhausted.

4,175,535

RANDOM PROPELLING DEVICE FOR BALLS AND THE LIKE

Carl H. Diem, 3969 68th St., Franksville, Wis. 53126

Filed Sep. 6, 1977, Ser. No. 830,595
Int. Cl.[2] F41B *3/04*
U.S. Cl. 124—7 **11 Claims**



1. A device for propelling a plurality of balls or the like in succession through space, comprising, in combination:

(a) a frame,

(b) a ball propelling arm mounted for pivotal swinging relative to said frame, and adapted to cyclically propel a succession of balls,

(c) drive means to pivotally swing said arm,

(d) means disposed in the path of said arm to impede the swinging of said arm,

(e) means to build up torsional energy in said arm while its swinging is impeded,

(f) means to release said arm from said swing impeding means to thereby release the torsional energy therein so that said arm acceleratingly swings,

(g) and means associated with said swing impeding means to cause release of said arm therefrom at random time intervals from cycle to cycle.

4,175,536

COMBINATION OF A BOW AND A POWER HANDLE

Richard F. Carella, 35572 Strathcona, Mt. Clemens, Mich. 48043

Filed Oct. 3, 1977, Ser. No. 839,022
Int. Cl.[2] F41B *5/00*
U.S. Cl. 124—23 R **13 Claims**

1. An archery bow assembly comprising; a bow having limbs, a bowstring interconnecting said limbs and movable to a drawn position to impart energy to an arrow upon release of the bowstring from the drawn position, and power means adapted to be gripped by an archer and connected to said bow for movement in the plane formed by the bow and the bowstring between an energy-storing position and a bowstring release position, said power means storing energy when the power means is acted upon by a force by an archer during the draw and for releasing said stored energy to be bow in said

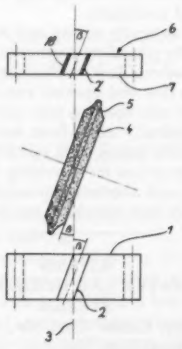
plane to move the entire bow forwardly upon release of the bowstring from the drawn position and relaxation of the force applied to the power means by an archer said power means including a connecting portion for connection to said bow.

4,175,537

DRESSING ARRANGEMENT FOR GRINDING WHEEL OF A GEAR FORM GRINDING MACHINE

Dieter Wiener, Tulpenstrasse 9, D-7501 Bruchhausen, Fed. Rep. of Germany

Continuation of Ser. No. 501,663, Aug. 29, 1974, abandoned. This application Nov. 14, 1977, Ser. No. 851,428
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1973, 2343494
Int. Cl.[2] B24B *53/06*
U.S. Cl. 125—11 CD **25 Claims**



1. A dressing device for a grinding machine for form grinding of internally or externally helically geared wheels, the grinding machine including a grinding wheel inclined with respect to the workpiece in correspondence with the helix angle of the workpiece gear, and a movably mounted dressing tool, the dressing tool has a contour corresponding to a contact line of the grinding wheel and workpiece gear being copied by the movably mounted dressing tool, characterized in that the dressing tool is provided with truing flank means, said truing flank means is in the form of a section of the workpiece gear and is constituted by a tooth, said dressing tool includes a carrier means for carrying said tooth, means are provided for releasably securing said tooth to said carrier means, at least a

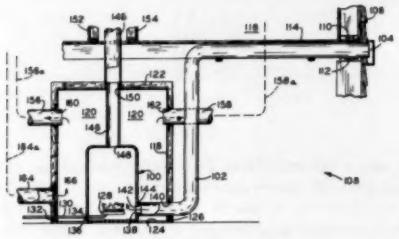
portion of the truing flank means are provided with an abrasive material consisting of diamond grains, spaced axle means are provided for respectively mounting said dressing tool, the grinding wheel and the workpiece gear, the spacing between said dressing tool and the grinding wheel and between the grinding wheel and the workpiece gear are equal, and in that said dressing tool is movably mounted for radial adjustment only.

4,175,538

ENERGY SAVING FURNACE CONSTRUCTION

Jimmie G. McCarty, 2805 Bethany Rd., Anderson, Ind. 46011

Filed Jan. 23, 1978, Ser. No. 871,637
Int. Cl.[2] F24C *3/00*
U.S. Cl. 126—85 B **17 Claims**



1. A fuel burning furnace construction for heating an enclosed interior defined by and separated from the exterior by a floor, a roof, and a wall construction between the floor and roof, comprising:

a fireproof shell positioned in the interior;

a furnace having a fuel burning enclosure situate in said shell; said shell and said furnace being spaced from one another to define a fluid chamber therebetween;

means for pneumatically sealing said fuel burning enclosure from said interior;

an inlet conduit having a first end opening exteriorly of said interior and a second end opening into fluid communication with said enclosure;

means for pneumatically sealing said inlet conduit from said interior and for providing combustion supporting fluid for the fuel exclusively from without said interior:

a flue having a first end opening exteriorly of said interior and a second end opening into said enclosure; said flue being pneumatically sealed from said interior to thus prevent combustion gasses from said interior;

heating medium means for providing heat transfer relative said chamber and disposed to transfer heat to a medium in the interior for heat transfer to and heating of the interior.

4,175,539

FIREPLACE HEATER AND HOME PRESSURIZATION SYSTEM

C. James McGuire, Kansas City, Mo., assignor to Fireplace Energy Inc., Kansas City, Mo.

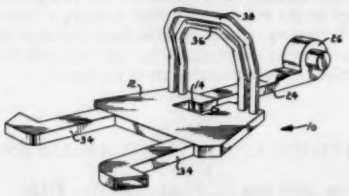
Filed Jan. 30, 1978, Ser. No. 873,272
Int. Cl.[2] F24B *7/00*
U.S. Cl. 126—121 **8 Claims**

1. A device for extracting heat from a fireplace, said device comprising:

a heat conductive shell adapted for installation in the fireplace and presenting a substantially hollow chamber therein for accommodating a flow of air, said shell having an inlet for directing incoming air into said chamber and an outlet for discharging air therefrom;

partition means in said shell dividing said chamber into an inlet side communicating with said inlet and an outlet side communicating with said outlet;

a heat conductive conduit extending generally above said shell, said conduit having a first end communicating with the inlet side of said chamber and a second end communicating with the outlet side of said chamber, and baffle means disposed in said shell between said inlet and the first



end of said conduit, said baffle means acting to direct air throughout the inlet side of said chamber;

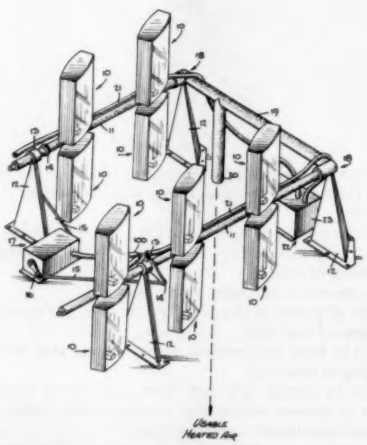
whereby air entering said inlet flows from the inlet side of said chamber and through said conduit prior to passing through the outlet side of said chamber and out said outlet.

4,175,540

SOLAR ENERGY COLLECTOR

William J. Roantree, and Paul S. Bartini, both of Port Washington, N.Y., assignors to Mel Modern Systems, Incorporated, Port Washington, N.Y.

Filed May 18, 1977, Ser. No. 797,906
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—425 **15 Claims**



1. A solar energy collector wherein circulating air is heated in a heat transfer element by concentrated radiation from a cylindrical reflector maintained in shape by air pressure and having means for tracking the sun powered by said circulating air.

4,175,541

SOLAR HEATING SYSTEM

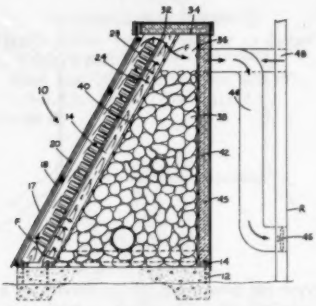
Calvert H. Midgley, 2200 Gravenstein Hwy., Sebastapol, Calif. 95472

Filed Nov. 14, 1977, Ser. No. 851,102
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—429 **4 Claims**

1. A solar heating system comprising:

a collector panel having a front side adapted for exposure to solar radiation and a back side;

a heat absorbing coating on said front side;
a plurality of circular openings through said panels;
a plurality of hollow metallic cylinders in said openings with most of the lengths thereof extending upward from said front side;
end closures on said cylinders on the end exposed from said front side;
heat absorbing coatings on the outer surfaces of said end closures and exterior portions of said cylinders exposed from said front side; and



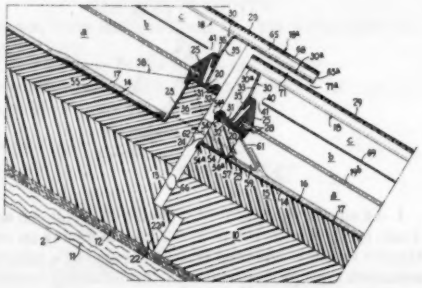
top closures with reflective surfaces on at least some of said cylinders exposed through the back side of said panel;
wherein said panel is part of an enclosure and including an accumulation of materials having heat retaining characteristics in said inclosure rearward of the back side of said panel;
whereby, said cylinders radiate heat directly to said materials.

4,175,542

DEVICE FOR COLLECTING SOLOR ENERGY WITH MAT OF INTERMINGLED FIBERS

Georges Duchene, Saint Bonnet le Chateau, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Jul. 27, 1977, Ser. No. 819,563
Claims priority, application France, Jul. 30, 1976, 76 23454
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—449 **19 Claims**



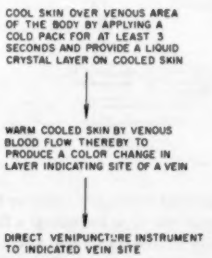
1. A device for collecting solar energy comprising in combination support means defining a trough having a fluidtight side, a heat and liquid absorbent mat of dark colour in said trough and supported by said fluidtight side, at least one translucent sheet creating a glasshouse effect supported by the support means and interposed between the mat and the sun and spaced from the mat to define with the mat a chamber, liquid inlet means disposed at a first end of the trough and liquid outlet means disposed at a second end of the trough opposed to said first end in a given direction, said liquid inlet means extending transversely of said direction and adjacent the mat and operative to provide an even distribution of the liquid transversely of the mat, and venting means putting said chamber in communication with the atmosphere to ensure that vapours from the liquid and from the mat can escape to the atmosphere and to ensure that the liquid flows freely under atmospheric pressure from the inlet means to the outlet means, the mat comprising intermingled fibres which define interstices which constitute guiding and spreading means, by the effect of capillarity and gravity, for the liquid in the course of the heating of the liquid by the solar energy.

4,175,543

VENIPUNCTURE METHOD

Fred K. Suzuki, Arlington Heights, and Thomas W. Davison, Streamwood, both of Ill., assignors to Liquid Crystal Products, Inc., Arlington Heights, Ill.

Continuation-in-part of Ser. No. 716,376, Aug. 23, 1976, abandoned, which is a continuation-in-part of Ser. No. 658,407, Feb. 17, 1976, Pat. No. 4,015,591. This application Mar. 23, 1978, Ser. No. 889,284
Int. Cl.[2] A61B *10/00*
U.S. Cl. 128—736 **20 Claims**


COOL SKIN OVER VENOUS AREA OF THE BODY BY APPLYING A COLD PACK FOR AT LEAST 3 SECONDS AND PROVIDE A LIQUID CRYSTAL LAYER ON COOLED SKIN
WARM COOLED SKIN BY VENOUS BLOOD FLOW THEREBY TO PRODUCE A COLOR CHANGE IN LAYER INDICATING SITE OF A VEIN
DIRECT VENIPUNCTURE INSTRUMENT TO INDICATED VEIN SITE

1. A method of effecting venipuncture in the human body which comprises the steps of:
(a) cooling the skin over a venous area of the body by applying a cold pack thereto for a period of at least 3 seconds and providing on the cooled skin in heat exchange relation thereto a layer of an enantiotropic cholesteric liquid crystalline phase material exhibiting a mesophase color change at a temperature reached by the skin upon warming by venous blood flow, the lower limit of the mesophase temperature range of said material being below the initial temperature of the skin over said area, said cooling being effected to bring the skin over said area to a temperature below said lower limit;
(b) warming the cooled skin by venous blood flow in said area thereby to produce a mesophase color change in the material in said layer delineating a vein beneath the layer; and
(c) directing an instrument for venipuncture to a site in said area indicated by said delineation to constitute the location of a vein.

4,175,544

IODO-ARYL CARBONATES FOR USE IN METHODS IN RADIOGRAPHY

Barry N. Newton, Lafayette, Ind., assignor to Lafayette Pharmacal Inc., Lafayette, Ind.

Continuation-in-part of Ser. No. 766,062, Feb. 7, 1977, abandoned, which is a division of Ser. No. 679,393, Apr. 22, 1976, Pat. No. 4,022,814, which is a continuation-in-part of Ser. No. 501,169, Aug. 28, 1974, abandoned. This application Jun. 28, 1978, Ser. No. 920,114

Int. Cl.[2] A61B *5/00;* **A61K** *29/02*

U.S. Cl. 128—654 **9 Claims**

1. A method for visualizing an inner body cavity in an animal comprising:

(a) placing an effective amount of a pharmaceutically acceptable iodinated phenyl carbonate compound into a body cavity in an animal; and

(b) X-raying the body cavity.

4,175,545

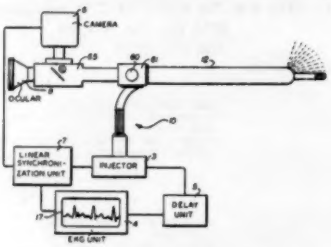
METHOD AND APPARATUS FOR FIBER-OPTIC CARDIOVASCULAR ENDOSCOPY

Zafer A. Termanini, Brooklyn, N.Y., assignor to Zafmedico Corp., Brooklyn, N.Y.

Continuation-in-part of Ser. No. 776,302, Mar. 10, 1977. This application Aug. 8, 1977, Ser. No. 822,560

Int. Cl.[2] A61B *1/06*

U.S. Cl. 128—666 **21 Claims**



1. In an improved fiber-optic catheter for use in cardiovascular endoscopy of the type including: a flexible sheath defining a longitudinally extending lumen, said sheath having a proximal end and a distal end; an afferent fiber-optic bundle disposed in said sheath for transmitting light from the proximal end of said catheter to the distal end thereof; and an efferent fiber-optic bundle disposed in said sheath for returning light from said distal end to said proximal end, the improvement comprising:

said sheath having an aperture extending therethrough from said lumen, said aperture being located proximally of said sheath distal end;

a tubular member comprising a longitudinally extending peripherally continuous wall defining a channel, said tubular member being slidably disposed within said lumen of said sheath, the distal portion of said tubular member having a distal end face and an aperture extending through said wall from said channel, said tubular member being longitudinally slidably movable in said lumen between a first position wherein said tubular member aperture communicates with said sheath aperture and a second position wherein said tubular member aperture is out of communication with said sheath aperture; and

means for indicating when said tubular member is in said first position.

4,175,546

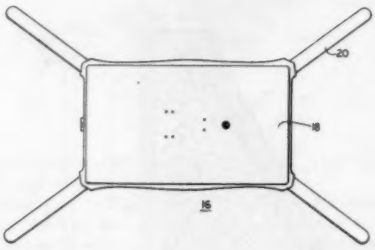
DEVICE FOR MEASURING SENSITIVITY TO VIBRATION

Samuel Goldblatt, Amberly Village, and Waller M. Scott, Jr., Union Township, Butler County, both of Ohio, assignors to Ahron P. Leichtman, Amberly, Ohio

Filed Sep. 6, 1977, Ser. No. 830,654

Int. Cl.[2] A61B *10/00*

U.S. Cl. 128—739 **3 Claims**



1. A device for measuring the sensitivity of a patient to externally applied vibration which comprises a pallometer head, a vibratable probe mounted on the head, means in the head for causing the probe to vibrate with a selected amplitude and at a selected frequency, a table having an opening therein, and means for supporting the head beneath the table with the probe extending through the opening in the table so that the probe can be engaged by a member of the patient as the member rests on the table, the means for supporting the head including a beam, means for attaching the head to the beam, means for pivotally supporting the beam, and counterweight means mounted on the beam to counterbalance the head so that the load of the probe on the member of the patient is constant.

4,175,547

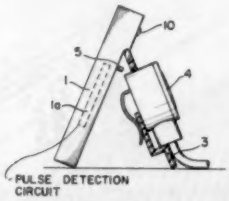
SPHYGMOMANOMETER AID

Sohachi Kurihara, 2-9 Daito 1-chome, Daito-ku, Tokyo, Japan

Filed Jul. 28, 1977, Ser. No. 820,035

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—680 **1 Claim**



1. An auxiliary device for use with a conventional non-electronic sphygmomanometer of the type including an inflatable bladder which is wrapped around the arm of a patient and a manometer gauge connected to the inflatable bladder, said auxiliary device being employable with such conventional non-electronic sphygmomanometer for the electronic measurement of blood pressures of the patient, said auxiliary device comprising:

a housing containing an electronic circuit including means for sensing and indicating pulses of a patient;

a board member pivotally connected to said housing and movable with respect thereto between a closed position and an open inclined position;

said board member including means for supporting a manometer gauge of a conventional non-electronic sphyg-

momanometer at an inclined orientation when said board member is in said open position;

electronic transducer means, electrically and flexibly attached to said electronic circuit, for sensing pulses of the patient; and

said transducer means having integral therewith means for attaching said transducer means to a cuff of an inflatable bladder of a conventional sphygmomanometer.

4,175,548

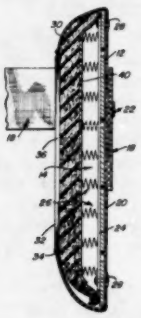
MASSAGE BACK BRACE

Robert J. Henry, Kelso, Wash., assignor to Harry A. Wood, Longview, Wash., a part interest

Filed Aug. 30, 1977, Ser. No. 829,197

Int. Cl.[2] A61H *1/00*; A61F *5/02*

U.S. Cl. 128—24 R **9 Claims**



1. A massage back brace, comprising, in combination:

(a) a support member;

(b) resilient means mounted on the support member for massaging the back of a user of the brace including a strip of self-supporting sheet material having a face, and a plurality of codirectionally extending, coiled compression springs mounted in spaced relation about the face of the strip; and

(c) cover means arranged over the resilient means for covering the resilient means.

4,175,549

BED FOR PATIENTS

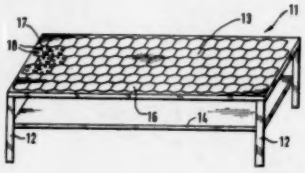
Geerd Hamer, Vorm Heiligen Kreuz 15, 6108 Weiterstadt, Fed. Rep. of Germany

Filed Aug. 29, 1977, Ser. No. 828,280

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1976, 2639072

Int. Cl.[2] A61H *1/00*

U.S. Cl. 128—24 R **14 Claims**



1. A bed comprising a substantial plurality of polygonal shaped lying surfaces dividing up and forming a major portion of the lying surface of the bed, which can be fixed in a wide range of spatial relation positions relative to each other to stably support and position the body portions of a user thereon, means including power storage means, for individually adjusting the vertical position of each polygonal lying surface against the force of the power storage,

means for individually adjusting the angle of inclination of each polygonal lying surface,

locking means for locking the elevation of the polygonal lying surfaces, and locking means for locking the inclination of the polygonal locking surfaces.

4,175,550

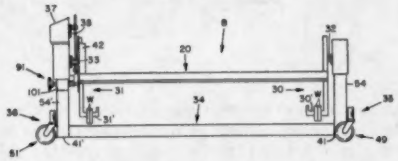
THERAPEUTIC BED

James R. Leininger, and John H. Vrzalik, both of 3417 Steen, San Antonio, Tex. 78219

Filed Mar. 27, 1978, Ser. No. 890,457

Int. Cl.[2] A61H *1/00*

U.S. Cl. 128—24 R **14 Claims**



1. A therapeutic bed for immobilized patients, comprising:

a motor-driven oscillating patient support platform mounted for longitudinal rotation about longitudinally extending axes;

a counter balance keel means extending below the patient support platform for mounting counter balance weight means to minimize unbalancing of the bed due to a patient resting on the patient support platform; and

a slip clutch means connecting the motor with the oscillating patient support platform and set to slip at a predetermined value when the counter balance weight means does not balance with the weight of a patient on the patient support platform.

4,175,551

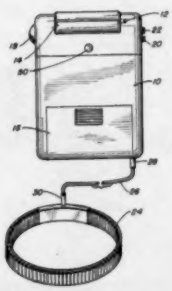
ELECTRICAL MASSAGE DEVICE

Irnee J. D'Haenens, Thousand Oaks, and Charles P. Lederger-ber, Beverly Hills, both of Calif., assignors to Electromed Incorporated, Beverly Hills, Calif.

Filed Nov. 11, 1977, Ser. No. 850,745

Int. Cl.[2] A61H *29/00*

U.S. Cl. 128—24.4 **8 Claims**



1. An electrical stimulator and massage apparatus comprising:

a housing;

a plurality of elongate, adjacent roller electrodes forming a massaging head in said housing;

electrical means for applying an electrical pulse to said roller electrodes;

a flexible expansion band indifferent electrode which may be slipped over a wrist or ankle whereby a particular area of

the body may be mechanically massaged and electroneurologically stimulated simultaneously; and

means for connecting said expansion band electrode to said electrical means.

4,175,552

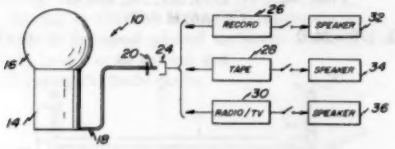
VIBRATION DEVICE

Brian G. Johnson, 65 Wolfe Pl., Hillside, Del. 07205

Filed Sep. 1, 1977, Ser. No. 829,653

Int. Cl.[2] A61H *1/00*

U.S. Cl. 128—32 **5 Claims**



1. A device for providing a pleasurable sensation when it is touched comprising a base, an audio speaker and a housing, said speaker including a circular rim comprised of rigid material, said housing comprising a hollow sphere supported on said base and completely enclosing said speaker with the entire periphery of said rim being in engagement with the wall of said housing to enable said housing to support said speaker and to enable the vibrations of said speaker to be transmitted to said wall to vibrate said wall, said wall being of sufficient thickness to muffle the sounds emanating from said speaker, an aperture in said wall, means for energizing said speaker, a portion of said last named means extending through said aperture and being in electrical connection with said speaker, another portion of said last named means being connected to an audio output so that said housing vibrates in response to the signal received from said audio output while the sounds from said speaker are muffled, and the rim of said speaker is disposed at about a right angle to said base so that said speaker faces upwardly within said housing.

4,175,553

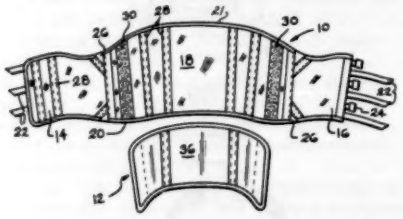
LUMBOSACRAL-ORTHOSIS ORTHOPEDIC SUPPORT

Henry W. Rosenberg, East Brunswick, N.J., assignor to Camp International, Inc., Jackson, Mich.

Filed Dec. 9, 1977, Ser. No. 859,088

Int. Cl.[2] A61F *5/02*

U.S. Cl. 128—78 **9 Claims**



1. A lumbosacral orthopedic device adapted to encircle the torso and having a removable orthosis appliance comprising, in combination, a flexible band member having inner and outer surfaces, a central region, end regions and upper and lower edges, mutually interconnectable connection means defined on said end regions, a substantially rigid frame disposed adjacent said inner surface at said central region, said frame including C-shaped substantially rigid and horizontal spaced members interconnected by substantially rigid elongated strips, and interengaging releasable fastening means defined on said frame and said band member releasably fastening said frame to said band member central region.

4,175,554

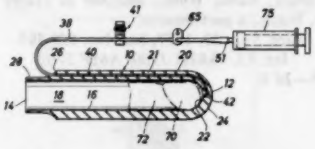
PROSTHESIS OF MALE IMPOTENCE

Frank J. Gerow, 1200 Moursund, Room 186, Houston, Tex. 77030

Filed Mar. 16, 1978, Ser. No. 887,224

Int. Cl.[2] A61F *5/00*

U.S. Cl. 128—79 **12 Claims**



1. A device for treating male impotence, comprising

a substantially cylindrical hollow body made of a flexible and elastic material, said body having a distal closed end and a proximal open end, said open end terminating in a thin flexible sleeve-like portion that can be rolled up over said thick-walled body portion to permit the distal end of a male penis to engage the inner walls of said hollow body, said thin flexible sleeve-like portion further functioning as a seal about the male penis when returned to its unrolled condition, and

a length of flexible tubing at least a portion of which is disposed longitudinally in the wall of said body, one end of said tubing communicating with the most distal end of the interior of said hollow body, the other end of said tubing freely extending from said body for permitting the evacuation of the air in the interior of said hollow body forward of said engaged male penis for exerting a vacuum therein for drawing said male penis to its anatomic limit into the interior of said hollow body.

4,175,555

BONE SCREW

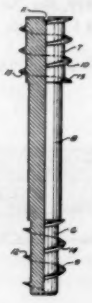
Timothy J. Herbert, Redfern, Australia, assignor to Interfix Limited, Hong Kong, Hong Kong

Filed Feb. 22, 1978, Ser. No. 880,099

Claims priority, application Australia, Feb. 24, 1977, PC9179

Int. Cl.[2] A61F *5/04*; A61B *17/18*

U.S. Cl. 128—92 B **4 Claims**



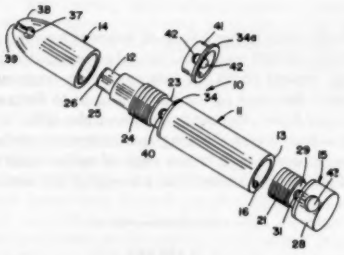
1. A bone screw for connecting a fractured portion of a bone to a parent bone, comprising:

(a) a shaft comprising a leading end portion, a trailing end portion and a central unthreaded portion;

(b) said central portion spacing said end portions apart and being axially longer than either of said end portions;

(c) a first uniformly pitched screw-thread on said leading end portion;
(d) a second uniformly pitched screw-thread on said trailing end portion, which relative to said first screw-thread, is like-handed but of different pitch;
(e) said second uniformly pitched screw-thread extending radially wholly beyond the circumference of said central portion, and the crest diameter of said second thread being greater than the diameter of any other part of the screw, thereby to adapt the screw for entire encasement within the bone portions to be connected thereby;
(f) both of said threads being adapted to thread in the cancellous material of the respective bone portions to be joined by the screw; and
(g) means on the trailing end of said trailing portion to accommodate a tool for driving the screw.

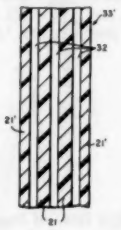
4,175,556
INHALER WITH FLOW-THROUGH CAP
Winthrop J. Freezer, 57 Hallam, San Francisco, Calif. 94103
Filed Apr. 7, 1978, Ser. No. 894,321
Int. Cl.[2] A61M *15/08*
U.S. Cl. 128—198 **8 Claims**



1. A tubular inhaler with a flow-through nose cap and having adjustments for controlling the concentration of a medicament dispensed when in use, comprising:
a cylindrical hollow barrel having open top and bottom ends with an internal compartment for absorbent means to store a medicament;
an end plug removably received in said bottom end of said barrel operable to sealingly close said bottom end of said barrel when fully inserted, said end plug having a vent means operable to control the flow of air into said bottom end of said barrel as said end plug is progressively removed; and
a bullet-shaped nose cap with a blind bore adjustably received on the top end of said barrel, said nose cap having an internal sealing means located in said blind bore operable to close the top end of the barrel when said cap is fully received on said barrel and also having a cross-bore means which communicates with said blind bore, allowing air/vapor flow from inside said barrel through said nose cap when it is adjusted to open said top end of said barrel without removing the nose cap.

4,175,557
POLYMERIC SHEETS
John H. Hung, Monroe, N.Y., assignor to International Paper Company, New York, N.Y.
Continuation-in-part of Ser. No. 634,908, Nov. 14, 1975, Pat. No. 4,034,751. This application Nov. 1, 1976, Ser. No. 735,671
Int. Cl.[2] A61F *13/00*; A61L *15/01*
U.S. Cl. 128—156 **18 Claims**

1. A drapable wound covering having a fabric texture on one surface thereof, comprising:
(a) a first layer of cured high-release non-sticking polymer forming one surface of the wound covering;
(b) a second layer of cured polymer having a tensile strength and tear strength for a 25 mil thick cured film thereof of at least about 400 pounds per square inch and at least about 20 pounds per inch, respectively, joined to the first layer of polymer; and
(c) a third layer of fabric texture joined to the second layer of polymer and forming the other surface of the wound covering, the wound covering having a water vapor phase transfer rate of about 2 to 10 mg./hr.-cm.[2], two dimensional elongation of at least about 100% in each direction, and anti-microbial barrier layer properties; and
wherein the layer of fabric texture is an integral, continuous, substantially non-woven, non-fibrous, non-filamentary,

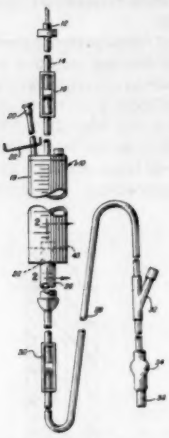


non-foamed, drapable polymeric sheet, at least one side of which has a fabric texture and comprises a plurality of interbonded continuous polymeric ribs defining between them recessed portions in the at least one side of the sheet; the ribs containing a plurality of elongated continuous channels interiorly located therein which extend in a direction generally parallel to the plane of the sheet to form a network of voids within the ribs which extend continuously throughout the at least one side of the sheet; and the sheet having a water vapor phase transfer rate of about 2 to 20 mg./hr.-cm.[2], two dimensional elongation of at least about 100% in each direction, and an open area between the ribs of zero to about 60%.

4,175,558
APPARATUS FOR ADMINISTERING PARENTERAL LIQUID IN SEQUENTIAL UNITS PROVIDED WITH A BALL VALVE FLOAT
John M. Hess, III, Carpentersville, and Herbert Mittleman, Deerfield, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Filed Jul. 15, 1977, Ser. No. 816,107
Int. Cl.[2] A61M *5/14*
U.S. Cl. 128—214 C **9 Claims**

1. In a parenteral liquid administering device which comprises tubular means for connecting said device to a source of said liquid, and an enlarged, liquid-holding chamber positioned in flow communication with said tubular means, said chamber including a bottom flow aperture, and a valve controlling flow through said aperture, the improvement comprising, in combination:
said valve including: a buoyant float ball, a valve seat positioned about said bottom flow aperture to receive said ball in air-tight sealing relation in the absence of sufficient liquid to float said ball, and apertured retention means surrounding said ball and proportioned to permit it to float in spaced relation from said valve seat in the presence of liquid passing through said apertured retention means, said apertured retention means defining a generally cylindrical chamber, said chamber defining an annular step positioned upstream from said valve seat and extending in generally normal relation to the axis of said enlarged

liquid holding chamber, said annular step being positioned about said float ball when positioned on the valve seat



whereby turbulent flow of liquid is created upon filling said retention means with the liquid.

4,175,559

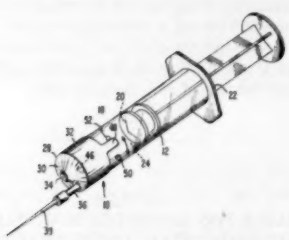
SEALABLE SYRINGE

Robert J. Kreb, III, Rolling Hill Rd., Skillman, N.J. 08558

Filed Apr. 6, 1978, Ser. No. 893,922

Int. Cl.[2] A61M *5/00*

U.S. Cl. 128—218 R **10 Claims**



1. A sealable syringe comprising:

(a) a housing defining a chamber therein which is sterile, said housing including a headwall, a sidewall and an open end, said headwall defining a housing aperture therein and a stem member mounted extending axially outward therefrom;

(b) a plunger located within said chamber and being movable axially with respect to said housing to vary the total volume of said chamber;

(c) a cap member including a head portion and a side portion located about said headwall and said sidewall of said housing, respectively, said side portion of said cap member being in snug fitting abutment with said side wall of said housing, said head portion being disposed in spaced relation with respect to said sidewall to provide an insulating space therebetween, said cap member being rotatably attached to said stem member to allow rotation of said cap member with respect to said headwall of said housing, said cap member including a nipple means which is hollow and defines a nipple aperture therein, said nipple aperture being selectively alignable with said housing aperture in said headwall to allow fluid flow between said nipple means and said sterile chamber; and

(d) sealing means positioned between said housing aperture in said headwall and said nipple aperture in said head portion to seal fluid flow therebetween when in alignment and to prevent fluid flow therebetween when not in alignment.

4,175,560

SWAB

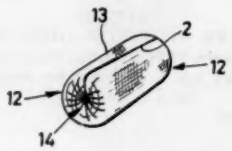
Ernst Knoll, Herrengassle 3, 7801 Umkirch bei Freiburg, Fed. Rep. of Germany, assignor to Paul Hartmann AG; Ernst Knoll and Werner Thieme, all of, Fed. Rep. of Germany

Continuation of Ser. No. 743,930, Nov. 22, 1976, abandoned. This application Jul. 1, 1977, Ser. No. 812,435

Claims priority, application Fed. Rep. of Germany, Nov. 21, 1975, 2552172

Int. Cl.[2] A61M *35/00*

U.S. Cl. 128—269 **13 Claims**



1. A swab comprising: a strip of material having two spaced ends interconnected by spaced lateral edges, said strip of material being wound about an axis extending transversely to a longitudinal direction of the material so as to form a plurality of individual layers disposed one above the other with one of said individual layers defining an outermost surface of the swab, and wherein each lateral edge of each of said individual layers of the swab is tucked into a center of the wound strip of material.

4,175,561

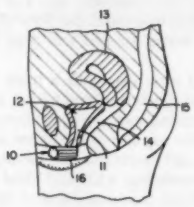
FEMININE HYGIENIC PADS WITH IMPROVED ABSORPTION

Shalom Z. Hirschman, 110-11 Queens Blvd., Forest Hills, N.Y. 11375

Filed Feb. 10, 1977, Ser. No. 767,586

Int. Cl.[2] A61F *13/00, 13/20*

U.S. Cl. 128—296 **5 Claims**



1. A feminine hygienic pad with improved surface sorption properties for use in the interlabial space in the area of the female urethral meatus and vaginal meatus for sorption of urine and other undesirable exudations comprising an elongated fibrous pad base of rod-like configuration having a continuous exposed exterior surface thereabout, the pad base including exposed integral surface protuberances of sorptive cells, said protuberances projecting perpendicularly outward from the exterior surface of said pad at equally spaced points spaced longitudinally and peripherally about substantially the entire exterior surface thereof; said protuberances comprising parallel side walls, said protuberances adding multiple sorptive surfaces to the exposed exterior surface of the pad base and increasing the effective exposed exterior sorptive surface area of the pad, and holes formed in at least selected ones of said

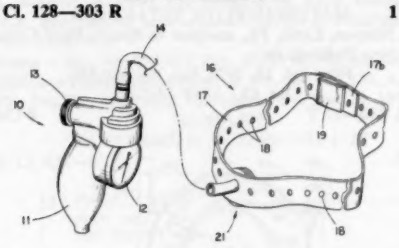
protuberances and opening outward through said exterior surface to expose additional sorptive surfaces.

4,175,562

INTRAOCULAR PRESSURE APPLICATOR

Paul R. Honan, P.O. Box 588, 1720 N. Lebanon St., Lebanon, Ind. 46052

Filed Jun. 30, 1977, Ser. No. 811,549
Int. Cl.[2] A61B *17/00*
U.S. Cl. 128—303 R 1 Claim



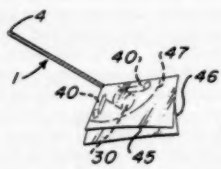
1. A device for lowering intraocular pressure in preparation for intraocular surgery comprising a headband adapted to extend around the head of the surgery patient, a single, circular, cup-shaped member attached to said headband and forming a chamber having a movable wall at one end, said chamber forming member having a bellows configuration with said movable wall of the chamber being integral with its pleated sidewall and formed of elastomeric material, the end of said member opposite said moveable wall being rigid and attached to said headband, means for the attachment of said member to the headband permitting limited pivotal movement of the member with respect to the headband, said member being adapted to be positioned at the orbital cavity of and in overlying relation to that eye of the patient to be subjected to surgery with said movable wall contiguous with the closed eyelid of said eye, and means for increasing the pressure in said chamber in monitored increments to thereby apply through said movable wall a predetermined amount of pressure on said eye.

4,175,563

BIOLOGICAL DRAINAGE SHUNT

Irving K. Arenberg, 6209 S. Highlands, Madison, Wis. 53705, and John B. Newkirk, 24400 Snow Valley Rd., Evergreen, Colo. 80439

Filed Oct. 5, 1977, Ser. No. 839,405
Int. Cl.[2] A61M *27/00*
U.S. Cl. 128—350 V 11 Claims



1. A body fluid drainage apparatus such as an inner ear shunt, comprising:

(a) an elongated tube composed of a material which will maintain its shape on being implanted and having two open ends;

(b) a flexible extension tube fixedly secured to and telescoping over one end of said elongated tube;

(c) a soft resilient closure means in the opposite end of said flexible tube and having at least one valve therein;

(d) an outer generally cylindrical housing fixedly secured to said elongated tube and having a cylindrical bore therein which generally encompasses a portion of said elongated tube and said extension tube;

(e) a pair of radially, oppositely extending arms fixedly secured to said elongated tube and said housing; and

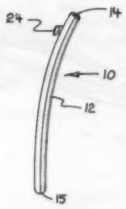
(f) a pair of superposed, generally rectangular thin, flexible, resilient flaps fixedly secured to said housing and said arms encompassing said flexible extension tube and said closure to prevent tissue form impinging thereon.

4,175,564

NASAL GASTRIC TUBE INSERTION GUIDE AND METHOD

In S. Kwak, 2846 Galahad Dr., Atlanta, Ga. 30345

Filed Mar. 13, 1978, Ser. No. 885,609
Int. Cl.[2] A61M *27/00*
U.S. Cl. 128—350 R 4 Claims



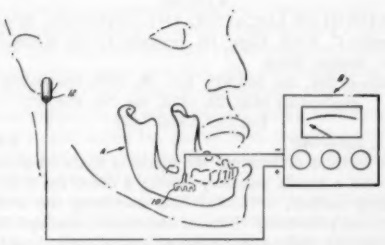
1. A guide for guiding a nasal gastric tube of preselected outside diameter into the esophagus and stomach of a patient for evacuation of stomach fluids and with said guide comprising an arcuately shaped tube formed with an end to end slit and having an inside diameter greater than the nasal gastric tube outside diameter, and a pull tab mounted to the exterior of said guide tube radially opposite said slit, whereby the nasal gastric tube may be inserted into the guide tube through a guide tube end and subsequently extracted through the guide tube slit by pulling the nasal gastric tube and the guide pull tab apart as the arcuately shaped guide tube is introduced into the patient's mouth and esophagus.

4,175,565

METHOD AND APPARATUS FOR STIMULATING OSTEOGENIC ACTIVITY IN BONE STRUCTURE ADJACENT A DENTAL IMPLANT

Angelo R. Chiarenza, Islip, and Charles M. Weiss, New York, both of N.Y., assignors to Oratronics, Inc., New York, N.Y.

Filed Jun. 22, 1977, Ser. No. 808,724
Int. Cl.[2] A61N *1/20*
U.S. Cl. 433—32 28 Claims



1. A method of stimulating osteogenic activity in bone structure adjacent to the contours of a dental implant comprising the steps of:

a. permanently imbedding in the jawbone a first electrode

comprising an electroconductive dental implant a portion of which extends into the oral cavity;

b. non-permanently affixing a second electroconductive electrode on the body of the subject; and

c. applying a direct current to said implant and said second electrode, said implant acting as a cathode and said second electrode acting as an anode.

4,175,566

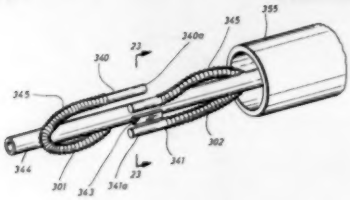
CATHETER FLUID-VELOCITY FLOW PROBE

Huntly D. Millar, Houston, Tex., assignor to Millar Instruments, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 602,655, Aug. 7, 1975, abandoned. This application Apr. 21, 1976, Ser. No. 679,066

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—692 **32 Claims**



1. A fluid-velocity flow probe for insertion into a vessel carrying conductive fluid in a subject, which probe is suitable for attachment to the distal end of a catheter, which probe develops a voltage which is proportional to the velocity of the conductive fluid passing the probe, and which prope comprises:

a housing;

means for attaching the housing to a catheter;

two electromagnets disposed in the housing of the probe for generating two separate magnetic fields, which electromagnets have ferromagnetic cores with gaps between poles;

two electrodes located in the housing with outer surfaces for fluid-electrode interface, said outer surfaces being exposed to the conductive fluid, each electrode being disposed such that the exposed outer surface for the fluid-electrode interface is substantially in the gap between the poles of the respective electromagnets;

electrical conductors associated with said electromagnets and electrodes;

electrically insulating bonding material encapsulating the electromagnets and forming the housing, the bonding material being formed to permit exposure of the outer surfaces of the electrodes so that conductive fluid flowing past the probe will come in direct contact with the electrodes.

4,175,567

METHOD OF LOCATING THE EPIDURAL SPACE

Bhupendra C. Patel, Elgin, Ill., assignor to The Kendall Company, Boston, Mass.

Division of Ser. No. 680,955, Apr. 28, 1976, abandoned. This application Mar. 23, 1978, Ser. No. 889,477

Int. Cl.[2] A61B *5/00*

U.S. Cl. 128—748 **6 Claims**

1. A method of locating the epidural space in a patient's body with a needle assembly having a distal tip, a proximal indicating surface, a flexible film overlying the indicating surface and permitting vision of said surface through the film when the film flexes toward the indicating surface, and a passageway communicating between the tip and a closed space intermediate the indicating surface and film, comprising the steps of:

positioning the tip and a distal passageway portion of the assembly inside the patient's body with the tip located adjacent the epidural space and with the film and indicating surface located outside the patient's body; and

advancing the assembly into the body while determining whether the visibility of the indicating surface is modified through the film or the film flexes away from the indicating surface to ascertain the position of the needle assembly tip in the patient's body.

4,175,568

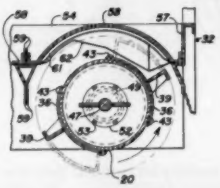
MATERIAL FLOW RETARDERS

Ray E. Nooyen, Leola, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Jul. 14, 1978, Ser. No. 924,546

Int. Cl.[2] A01F *12/20*

U.S. Cl. 130—27 T **8 Claims**



1. In a crop harvesting and threshing machine with axial flow threshing and separation having:

(a) a casing with an infeed area to receive crop material and a discharge area with a suitable outlet to dispose of the crop material residue defining therebetween a generally axial path, the casing further having an upper portion of solid periphery and a lower portion;

(b) a rotatable threshing and separating member within the casing extending generally rearwardly from the infeed area to the discharge area, and about which crop material axially flows;

(c) shaft means protruding from one end of the threshing and separating member adjacent the discharge area and about which the threshing and separating member is rotatably supported and driven;

(d) drive means for rotating the threshing and separating member;

(e) rasping means affixed to the threshing cylinder at predetermined spaced intervals;

(f) separator means affixed to the threshing and separating member rearwardly of the rasping means and adjacent the discharge area for separating the grain from the residue;

(g) a concave of predetermined length supported by the lower portion of the casing for cooperation with the rasping means thereby defining a threshing region;

(h) a separating assembly of predetermined length supported by the lower portion of the casing and rearwardly of the concave cooperatively interacting with the separator means to thereby define a separating region;

(i) truncated generally helical crop transport means attached to the upper portion of the casing at predetermined intervals to facilitate the axial flow of the crop material about the threshing and separating member as the crop material moves from the infeed area of the casing rearwardly toward the discharge area;

(j) a plurality of crop material flow inhibiting means affixed to the upper portion of the casing adjacent the discharge end in a reverse generally helical pattern to the crop transport means comprising at least a first member and a second member, the first member being generally elongate, the second member being contoured in shape to conform to the shape of the separator means as the separator means rotates on the threshing and separating member about the shaft means so that the crop material axially transported from the infeed area to the discharge area is decelerated and stripped from the separator means and

deflected into the discharge outlet such that it is prevented from wrapping about the shaft means.

4,175,569

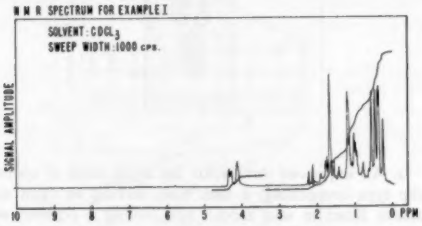
SUBSTITUTED-1-OCETYL-3,3-DIMETHYLCYCLOHEXANE EMPLOYED IN FLAVORING TOBACCO COMPOSITIONS

John B. Hall, Rumson; Mark A. Sprecker, Sea Bright; Frederick L. Schmitt, Holmdel, and Manfred H. Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

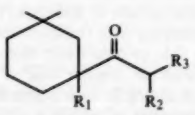
Division of Ser. No. 753,617, Dec. 22, 1976, Pat. No. 4,081,429, which is a continuation-in-part of Ser. No. 713,429, Aug. 11, 1976, Pat. No. 4,021,480. This application Sep. 19, 1977, Ser. No. 834,501

Int. Cl.[2] A24B *3/12*; A24D *1/00, 1/18*

U.S. Cl. 131—9 **3 Claims**



2. A smoking article comprising (i) tobacco or a tobacco substitute and (ii) a flavorant for said tobacco or tobacco substitute comprising the compound having the structure:



wherein R_1 is methyllyl, R_2 is hydrogen and R_3 is hydrogen, or wherein R_1 is hydrogen, R_2 is methyllyl and R_3 is methyllyl.

4,175,570

APPARATUS FOR BUILDING A CONTINUOUS TOBACCO STREAM

Uwe Heitmann, Schwarzenbek, Fed. Rep. of Germany, assignor to Hauni-Werke Körber & Co., KG., Hamburg, Fed. Rep. of Germany

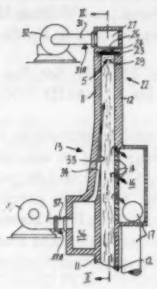
Filed May 10, 1977, Ser. No. 795,560

Claims priority, application Fed. Rep. of Germany, May 26, 1976, 2623547

Int. Cl.[2] A24C *5/39*; B65G *53/30*; A24B *7/14*

U.S. Cl. 131—84 B **14 Claims**

1. Apparatus for building a continuous tobacco stream, comprising a source of tobacco particles; an endless driven foraminous conveyor having an elongated portion; a suction chamber at one side of said portion; a duct having an inlet and an outlet which constitutes a narrow channel and is adjacent to the other side of said portion and is elongated in the direction of movement of said portion; means for feeding tobacco particles from said source into said duct by way of said inlet; and means for accelerating and advancing the particles in said duct toward said outlet and against the other side of said portion independently of said feeding means, said duct having a wall provided with at least one opening which is immediately adjacent to said portion of said conveyor and said advancing means including a source of compressed gaseous fluid and means for supplying compressed fluid from said last mentioned source to said opening, said supplying means including means for admitting to said opening a current of compressed fluid having a component of movement in said direction and said advancing



means further comprising means for transporting tobacco particles from said inlet into the range of said current.

4,175,571

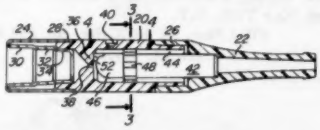
CIGARETTE FILTERS

Gerald T. Swanson, Fort Collins, Colo., assignor to Teledyne Industries, Inc., Ft. Collins, Colo.

Filed Aug. 29, 1977, Ser. No. 828,505

Int. Cl.[2] A24D *1/04*; A24F *7/02, 7/04*

U.S. Cl. 131—171 A **2 Claims**



1. In a system for progressively withdrawing from smoking and which has a plurality of cigarette filters each of which includes:

a barrel, a mouthpiece coupled to one end of said barrel and a tubular cigarette-receptive tip coupled to the other end of said barrel, including an improvement in each filter which comprises:

a transverse wall located internally of said barrel adjacent to said tip;

means defining a restricted orifice through said wall;

means defining an air inlet through the wall of said barrel at a location downstream from said transverse wall;

a stem received within said barrel and defining a passage for the flow of smoke from said tip through said orifice to said mouthpiece with said inlet also communicating to said passage for the flow of air through said inlet to said mouthpiece in mixture with said smoke, said stem including a nose facing but spaced from the outlet end of said orifice and defining a collection area for particulate matter included in said smoke;

and means for mounting said stem within said barrel;

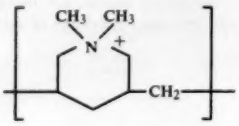
and the further improvement in which each successive different one of said filters has an orifice of respectively decreased diameter and an inlet of respectively increased diameter, the relationship of said diameters as between the different ones of said filters establishing a substantially constant impedance to the drawing of fluid through the corresponding mouthpiece.

4,175,572
HAIR CONDITIONING WAVING AND STRAIGHTENING COMPOSITIONS AND METHODS

Du Y. Hsiung, Park Forest, and William H. Mueller, Oak Park, both of Ill., assignors to Johnson Products Co., Inc., Chicago, Ill.

Filed Jul. 22, 1977, Ser. No. 818,282
Int. Cl.[2] A45D *7/00*
U.S. Cl. 132—7 10 Claims

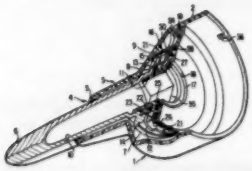
1. A hair conditioning composition for use under highly alkaline conditions comprising an aqueous dispersion containing from about 1 to about 20 weight percent of mineral oil, from about 1 to about 20 weight percent of a fatty alcohol having 12 to 18 carbon atoms, from about 1 to about 15 weight percent of a non-ionic emulsifier, and from about 0.05 to about 20 weight percent of a quaternary polymer having recurring units of the formula:



4,175,573
MANICURE ATTACHMENT

Paul D. Burian, Elmsford, N.Y., assignor to Clairol Incorporated, New York, N.Y.

Filed Mar. 30, 1978, Ser. No. 891,891
Int. Cl.[2] A45D *29/05*
U.S. Cl. 132—73.6 8 Claims



1. A cuticle attachment for rotary manicuring units comprising

a casing,

a power transfer member mounted for rotation in said casing, said power transfer member having

a plurality of driving cam teeth arranged symmetrically about the axis of rotation thereof,

a pusher member in said casing mounted for reciprocation therein,

an aperture in said casing aligned with the axis of reciprocation of said pusher member, a portion of said pusher member being extended through said aperture, said pusher member having

a plurality of follower cam teeth arranged opposite said driving cam teeth and symmetrically about the axis of rotation of said power transfer member,

biasing means for normally biasing said driving cam teeth and said follower cam teeth axially from each other,

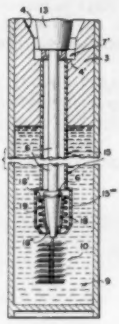
means for confining said pusher member against rotation with said power transfer member, and

mounting and driving means for mounting said casing on a rotary manicuring unit with the power transfer member in driven engagement therewith.

4,175,574
COSMETICS APPLICATOR DEVICE

Carlos A. Zulberti, Ramos Mejia (Prov. de Buenos Aires), Argentina

Filed Dec. 29, 1977, Ser. No. 866,165
Claims priority, application Argentina, May 16, 1977, 267640
Int. Cl.[2] A45D *40/26*
U.S. Cl. 132—88.7 5 Claims



1. An improved device for the application of cosmetics of the type comprising, a tank body having an open mouth, a sleeve fitted in said mouth and having a conduit which is coaxial and slightly tapering towards the inside of the tank body until terminating in a cylindrical portion having a flat annular seat, said conduit provided with a central bore followed by a widened portion the broader part of which is oriented towards said tank body a cap having within its opening a coaxial cylindrical body, a stem projecting from the center of said coaxial cylindrical body, an applicator at the end of said stem, a collar affixed to said stem, the outside diameter of said collar registering with the diameter of the bore of said sleeve and being able to pass freely therethrough, said stem being provided with an annular disc of elastomer material which is capable of sliding in tight engagement along said stem and the outside diameter of which is slightly larger than the inner diameter of the coaxially tapered conduit of the sleeve inserted into the mouth of the tank body, wherein said annular disc slidingly mounted on said stem has at least three openings which at spaced points interrupt the cylindrical continuity of the perimeter of said disc, a tube projecting axially from the inner end of said sleeve and which receives said stem and its applicator, the lengths of the tube and stem being dimensioned in such a manner that only said applicator is immersed in the cosmetic contained in said tank body in a location immediately adjacent to a tapered, calibrated diameter mouth provided in the free end of said tube, a collar on said stem, said collar located adjacent to said applicator, said collar having a diameter which is slightly smaller that the inside diameter of said tube in order to define therewith an air-venting passage while the applicator is being inserted.

4,175,575
DISHWASHER WITH OSCILLATING ROTARY SPRAY ARM

Donald S. Cushing, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Mar. 27, 1978, Ser. No. 890,428
Int. Cl.[2] B08B *3/02*
U.S. Cl. 134—176 19 Claims

1. A dishwasher including a dishwasher cabinet having an interior space provided therein; rack means for positioning dishware items within said cabinet interior space; and means for directing jet sprays of cleaning liquid at said items of dishware, said means including:

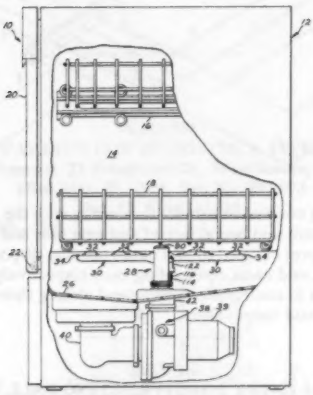
a spray arm comprised of an elongated hollow member;

means rotatably mounting said spray arm within said cabinet interior space for rotation about a central axis transverse to the longitudinal axis of said spray arm;

means for causing said cleaning liquid to be circulated under pressure into the interior of said spray arm;

a plurality of jet spray openings formed along the length of said spray arm on either side of the axis of rotation thereof;

whereby said cleaning liquid passes under pressure out through said jet spray openings to direct washing jet sprays at said dishware items;



means for causing said spray arm to continuously rotate in a single direction about said central transverse axis whenever said cleaning liquid is circulated into said spray arm;

means for producing oscillation of said spray arm about its longitudinal axis, said means including drive means responsive to said rotation of said spray arm about said central transverse axis to continuously oscillate said spray arm about said longitudinal axis;

whereby said spray arm is oscillated by said rotation of said spray arm about said central axis.

4,175,576

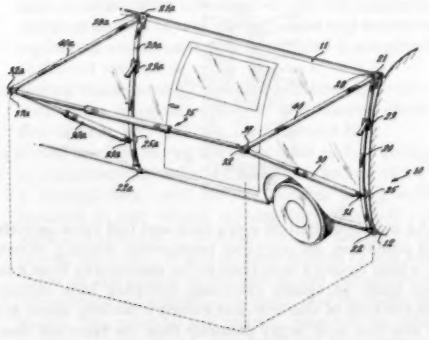
TENT

Jack Iby, 9553 Natick Ave., Sepulveda, Calif. 91343

Filed Aug. 18, 1978, Ser. No. 935,024

Int. Cl.[2] E04F *10/06*

U.S. Cl. 135—1 A **6 Claims**



1. A tent for attachment to the side of a van or similar kind of vehicle, comprising:

a pair of frame straps to be hooked with one end each on a gutter edge of the van and with the respective other end around the bottom edge of a van side;

a pair of poles serving as braces and being respectively hooked with one end to the straps at points between the strap ends;

a pair of holding straps each detachably fastened by one end to the ends of the frame straps adjacent to gutter, the other ends of the holding straps being detachably fastened to the respective other ends of the poles;

a cross pole detachably fastened to said other ends of the poles of the pair;

tent sides hung from the corners of a rectangle as defined by the upper frame strap clamps and upper ends of the poles of the pair; and

a canopy mounted on the corners of said rectangle.

4,175,577

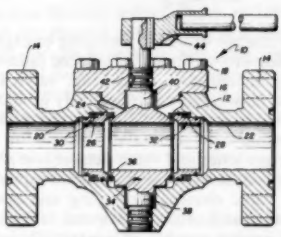
MEANS AND METHOD FOR IN-LINE REMOVAL OF SEAT RINGS IN BALL VALVES

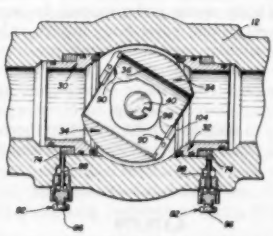
Gary W. Kacal, Rosenberg, and Charles C. Partridge, Houston, both of Tex., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed May 3, 1978, Ser. No. 902,324

Int. Cl.[2] F16K *43/00, 25/00*

U.S. Cl. 137—15 **11 Claims**





1. A method for removing a spring-loaded seat ring from a ball valve having a body in which a ball is mounted for rotation and a cover plate is removably connected to the body for permitting removal of the ball and seat ring, the seat ring being mounted for longitudinal movement between a retracted position spaced from the ball and an extended position biased into sealing relation with the ball; said method comprising the following steps:

removing the cover plate from the valve body to permit access to the ball;

inserting a cam within the valve body and positioning the cam on the ball in a spaced relation to the adjacent seat ring;

then rotating the ball so that the cam engages the seat ring upon such rotation and cams the seat ring into a retracted position spaced from the ball;

actuating a seat ring retainer manually to hold the seat ring in the releasable retracted position;

then removing the cam and ball;

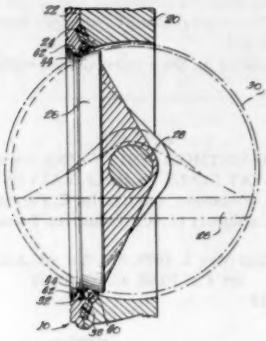
and releasing the seat ring for removal from the valve body.

4,175,578

FIRE RESISTANT SEAT FOR BUTTERFLY AND BALL VALVES

Werner K. Priese, Barrington, Ill., assignor to Hills-McCanna Company, Carpentersville, Ill.

Filed Oct. 11, 1977, Ser. No. 840,601
Int. Cl.[2] F16K *1/22*
U.S. Cl. 137—67 **11 Claims**



1. In a flow control valve for providing emergency sealing action upon inadvertant, thermally induced failure of the primary seal, the combination comprising: valve body means defining a fluid flow aperture; a selectively positionable valve element disposed in said fluid flow aperture; primary sealing means cooperating with said valve element for sealing said fluid flow aperture when said valve element is in a valve closed position; and a secondary, emergency seal adapted to cooperate with said valve element for sealing said aperture upon subjection of said valve to a thermal event, said secondary seal comprising an annular member of substantially incombustible material capable of releasing stored stresses upon being heated above a predetermined temperature mounted on said valve body means and including a first portion hermetically connected to valve body means and a second, lip portion free to move with respect to said valve body means, at least said lip portion of said annular member having prestressed regions normally situating said lip portion out of firm contacting relationship with respect to said valve element, and upon thermal relief of the stresses stored in said prestressed regions, said lip portion reacting to dispose at least a portion thereof into sealing engagement with said valve element when in the valve closed position.

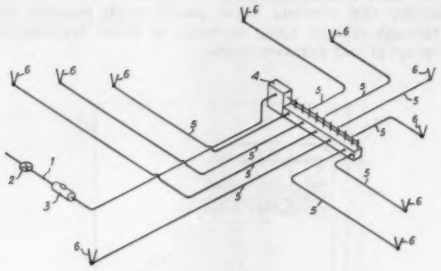
4,175,579

DEVICE FOR AUTOMATIC, SELECTIVE WATERING OF PLANTS

Louis Richard, Cholet, France, assignor to Jean Ollivier, Mortagne-sur-Sevre, France

Filed May 3, 1977, Ser. No. 793,423
Claims priority, application France, May 4, 1976, 76 13228
Int. Cl.[2] G05D *11/00*
U.S. Cl. 137—119 **5 Claims**

1. Apparatus for the automatic and selective watering of plants or the like with a supply of water under pressure and with the aid of a number of individual water distribution pipes, said apparatus comprising a reduction gear housed in a gear case, a driving element for driving said reduction gear, means for supplying water under pressure to drive said driving element, said gear case having a lateral face with an outlet opening for the water and a rotatable shaft which carries a plurality of spaced cams and which is driven by said reduction gear, a plurality of valve means of the type operated by a pilot valve, each said valve means having, on one side, a water inlet port having a selected shape and, on the opposite side thereof, a water outlet port having a shape that is complementary to said selected shape so that said inlet port of a said valve means can interfit to couple with the outlet port of an adjacent valve means, each said valve means having an internal chamber in flow communication with said inlet and outlet ports of each said valve means, another outlet port for the distribution of water when said valve means are open, said plurality of valve



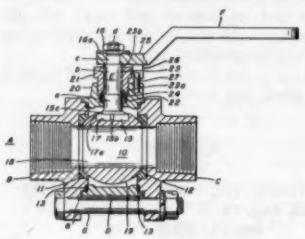
means being coupled in parallel flow series with the first valve means adjacent said lateral face of said gear case and having its water inlet port coupled to said outlet opening disposed in said lateral face, said cams cooperating each respectively with the valve means to control the opening and closing thereof during rotation of said output shaft.

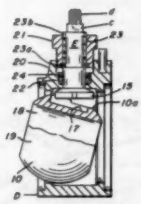
4,175,580

BOTTOM ENTRY POSITIVE ACTING BALL VALVE

Adolphe W. Kalbfleisch, Box 64, Jeannette, Pa. 15644

Filed Nov. 21, 1977, Ser. No. 853,120
Int. Cl. F16k *43/00, 5/00*
U.S. Cl. 137—315 **17 Claims**





1. An improved bottom entry stem and ball valve assembly which comprises, an open-end passageway defining housing body, a boss having a bore open to the passageway from a side of said body, an axially extending operating stem mounted within the bore of said boss and having a latching spline at its inner end that is of larger diameter than the bore and that is positioned in the passageway of said housing body, a valve ball operatively positioned in said body and having a fluid flow passageway therethrough and a latching recess in its outer wall, said spline and recess each having at least three end-connected depthwise extending side wall length portions that define enclosing continuous side walls for said spline with at

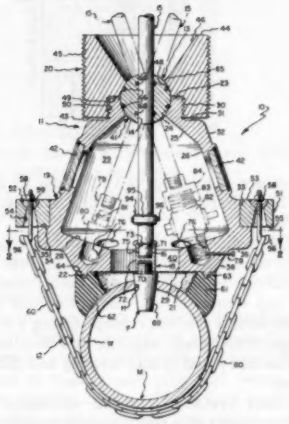
least one cooperating pair of "in" and "out" pivot-shaped corner portions and with side wall length portions of said recess fully encircling and providing a closed angular area about said spline, said spline and recess being substantially complementary in shape, and said spline being of slightly smaller size than said recess for pivotal-slidable entry into and removal from said recess when said ball is tilted at said recess from one end of the passageway of said housing body and with respect to a side wall length portion of said spline that is in a substantially cross-aligned position facing the one end of the passageway.

4,175,581

APPARATUS FOR REMOVING A FITTING

Ralph L. Peterson, 27 Woodward Dr., West Seneca, N.Y. 14224

Filed Mar. 29, 1978, Ser. No. 891,073
Int. Cl. F16K *43/00*
U.S. Cl. 137—319 **5 Claims**



1. Apparatus for moving a fitting relative to a hole provided in a wall, comprising:

a housing provided with a chamber therewithin and having a first opening and a second opening, each of said openings communicating said chamber with the atmosphere, a marginal portion of said housing about said second opening having a concave surface configured as a segment of a surface of revolution;

mounting means adapted to secure said housing to said wall such that a marginal portion of said housing about said first opening will sealingly surround said hole;

a pivotal member having a convex outer surface configured as a segment of a surface of revolution and provided with a through-bore, said pivotal member being sealingly mounted in said second opening such that said convex surface is arranged to face said concave surface to enable pivotal movement of said member relative to said housing about an axis normal to the axis of said through-bore;

a rod sealingly and slidably mounted in said throughbore and having one marginal end portion arranged for selective movement toward and away from said first opening; and

engagement means carried by said rod marginal end portion and adapted to engage a fitting;

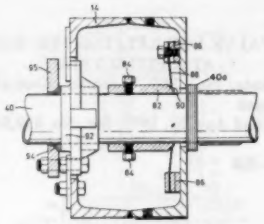
whereby when said engagement means is engaged with a fitting, said rod may be pivotally and axially manipulated to move said fitting relative to said hole.

4,175,582

ISOLATING/PRESSURE RELIEF DAMPER

Ronald A. Ashdown, Redhill; Keith Ewing, Chorleywood, and Stuart I. Birkenhead, London, all of England, assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Apr. 11, 1978, Ser. No. 895,326
Int. Cl.² F16K *49/00*
U.S. Cl. 137—334 **10 Claims**



1. A damper for controlling the passage of hot gases through a duct, said damper comprising:

(i) a frame,

(ii) at least one opening defined within said frame,

(iii) at least one damper positioned within said opening,

(iv) a shaft for each damper, said shaft being rotatable whereby said damper blade is movable between a closed position in which said damper blocks said opening and an open position in which gases can pass through said opening,

(v) at least one passageway in said frame,

(vi) means for passing a coolant through said passageway in said frame,

(vii) a bearing for one end of said shaft, said one end passing through said frame and said bearing being attached to said frame and cooled by passage of coolant through said passageway in said frame, and

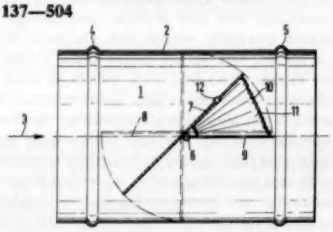
(viii) a one-way seal provided where said one end of said shaft passes through said frame to allow flow of coolant from said passageway into said duct and prevent flow in reverse.

4,175,583

REGULATOR VALVE

Wolfgang Finkelstein, Neukirchen-Vluyn; Gregor Baumeister, Krefeld, and Josef Haaz, Neukirchen-Vluyn, all of Fed. Rep. of Germany, assignors to Gebruder Trox, Gesellschaft mit Beschrankter Haftung, Neikirchen-Vluyn, Fed. Rep. of Germany

Filed Jul. 11, 1977, Ser. No. 814,177
Int. Cl.² G05D *7/01*
U.S. Cl. 137—504 **7 Claims**



1. A regulator valve for maintaining a constant volumetric flow comprising a flap having upstream and downstream faces installed within a flow duct and pivotable from an open position to a closed position, means biasing said flap toward said open position, a support plate lying in a plane defined by the

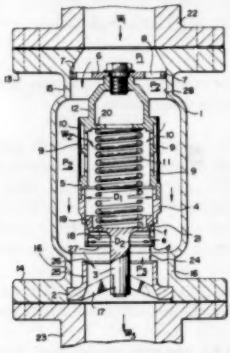
pivoting axis of said flap and the longitudinal axis of said duct, a bellows supported on said support plate on the downstream side of said flap and connected to said flap, inlet means establishing a flow passage from the upstream side of said flap to the interior of said bellows and being open against the direction of flow for transmitting dynamic pressure of flow to the interior of said bellows for expanding said bellows and thereby urging said flap toward said closed position.

4,175,584

CONTROL VALVE FOR KEEPING THE RATE OF FLOW AT A FIXED VALUE

Sotokazu Rikuta, No. 24-7, 2-chome, Koun-cho, Maebashi, Gumma, Japan

Filed Aug. 31, 1977, Ser. No. 829,548
Int. Cl.[2] F16K *31/12*
U.S. Cl. 137—504 **5 Claims**



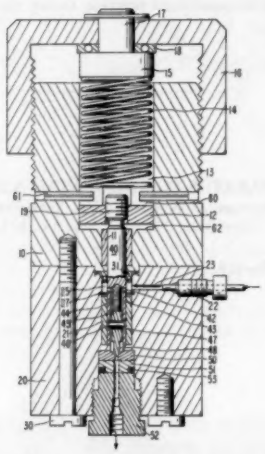
1. A constant flow regulating valve comprising a valve casing having inlet and outlet ports in spaced locations therein, a tubular guide member mounted fixedly and coaxially within said valve casing at said outlet port, said tubular guide member having a first annular peripherally extending surface at one axial end thereof, a hollow slide means positioned coaxially within said valve casing and spaced from said valve casing to define an annular fluid chamber therebetween, said slide means comprising a hollow cylindrical valve plug and a hollow valve cylinder connected thereto, said valve plug having a second annular peripherally extending surface at one axial end thereof, said valve plug being disposed such that said second annular surface is located in flow restricting relationship relative to said first annular surface on said tubular guide member to thereby define a variable flow control passage between said first and second annular surfaces, a support element fixedly mounted on said tubular guide member, said support element extending coaxially into said hollow slide means, a spring means disposed coaxially within and enclosed within said hollow slide means, said spring means being biased between said support element and said slide means to urge the slide means axially away from said tubular guide member, said valve cylinder having a plurality of ports permitting the flow of fluid from said annular chamber into said hollow slide means such that the pressure of fluid in said hollow slide means is equal to the pressure in said annular chamber, an orifice plate carried by said slide means for movement within said valve inlet port and having at least one aperture therein for the flow of fluid therethrough from said inlet port to said annular chamber such that the pressure differential on opposite sides of the orifice plate is counterbalanced by the bias of said spring means to thereby effect constant flow regulation, said cylindrical valve plug having an outer diameter at the axial end portion thereof which is closer to said outlet port which is equal to the inner diameter at the other axial end portion thereof to effect pressure balancing of the valve plug.

4,175,585

PRESSURE REGULATOR WITH MINIMUM DEAD VOLUME

Detlef R. Boehme, Walnut Creek, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 772,785, Feb. 28, 1977, abandoned.
This application Mar. 17, 1978, Ser. No. 889,599
Int. Cl.[2] F16K *31/12*
U.S. Cl. 137—509 **2 Claims**



1. A pressure regulating valve for use in a high-pressure liquid chromatography fluid flow line, said valve comprising:

a housing,

a cylindrical slidable piston structure having an axial bore therein such that said piston structure has a partially hollow interior volume having a bore opening, cylindrical walls and a bore bottom, said cylindrical walls surrounding said hollow interior volume having a radial port therethrough immediately adjacent said bore bottom, said piston structure fitted in said housing and slidable in respect thereto,

a valve seat structure disposed externally of said piston structure, said valve seat structure including a valve seat,

means for urging said piston structure toward said valve seat structure at a selectable pressure,

means for preventing contact of said piston structure with said valve seat,

a cylindrical needle structure disposed within said piston structure, and

spring biasing means disposed entirely within said bore of said piston structure for urging said needle structure toward said valve seat structure,

said piston structure being configured so that the flow line fluid in the interior volume of said piston structure urges said piston structure away from said valve seat structure when the pressure of said flow line fluid is greater than the selected pressure at which said piston structure is urged toward said valve seat structure, thereby establishing an equilibrium between said flow line pressure and said selected pressure, said needle structure moving toward contact with said valve seat structure when the pressure in said flow line is slightly less than said selected pressure, thereby tending to close said valve,

conduit means connectable to said flow line, said conduit means terminating in an annular space formed in said housing substantially surrounding said piston structure immediately adjacent said port, said annular space having a larger dimension than said port in the direction in which said housing is slidable, said bore containing said spring bias means and said needle structure and whereby the entire bore is directly in a non-branching flow path be-

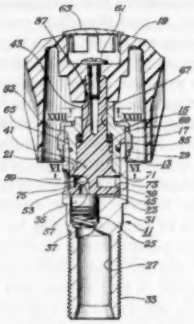
tween said flow line and said valve seat so that there are minimum trapped fluid areas and rapid purging of said bore is attainable.

4,175,586

FAUCET VALVE WITH DUAL FLOW CONTROL

Dennis J. Hayman, Abilene, Tex., assignor to Wallace-Murray Corporation, New York, N.Y.

Filed Jul. 19, 1977, Ser. No. 817,102
Int. Cl.[2] F16K *25/00*
U.S. Cl. 137—614.11 12 Claims



1. A faucet valve comprising:

a. a valve body having a cylindrical cavity with a sidewall, a bottom wall and an open top;

b. an inlet opening communicating with said cavity via said bottom wall and including inlet seal means, and an outlet opening communicating with said cavity via said sidewall;

c. a generally cylindrical control member including a control disc portion merging with a body portion which merges with a stem portion;

i. said control disc portion having an enlarged diameter portion forming a flange with an upwardly facing seating surface and a substantially planar bottom surface disposed to engage said inlet seal means, and a first control opening of a predetermined configuration for cooperation with said inlet seal means, and with said flange merging with said substantially planar bottom surface;

ii. said body portion having a side opening of predetermined configuration communicating with said first control opening;

d. a generally cylindrical retainer member having an exterior surface that is received in mating relation by the said valve body cylindrical cavity sidewall, and having a central bore an upper portion of which is received in mating relation by said control member stem portion and a lower portion of which is received in mating relation by said control member body portion;

i. said central bore lower portion forming with a lower portion of the retainer member exterior surface a retainer member open ended skirt portion having a downwardly facing bottom surface disposed in mating relation with said flange upwardly facing seating surface;

ii. said retainer member skirt portion having an opening therein of predetermined configuration disposed for cooperation with said control member body portion side opening and communicating with said outlet opening;

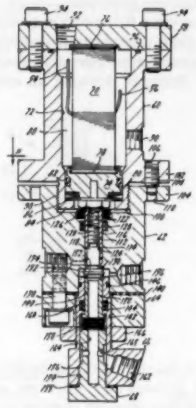
whereby, rotation of said control member about its longitudinal axis controls fluid communication between said inlet and outlet opening, first by coaction of said first control opening with said inlet opening and second, by coaction of said control member body portion side opening, said retainer member skirt portion opening and said outlet opening.

4,175,587

FUEL INJECTION SYSTEM AND CONTROL VALVE FOR MULTI-CYLINDER ENGINES

Alexander Chadwick, South Lyon; Magdi K. Khair, Birmingham, and Jay C. McCombie, W. Bloomfield, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Oct. 31, 1977, Ser. No. 846,756
Int. Cl.[2] F02M *51/00*
U.S. Cl. 137—625.65 4 Claims



1. A fuel injection system control valve comprising:

a valve body having an inlet connected to a source of high pressure fuel and being in fluid communication with a first chamber, an outlet connected to a fuel injector and in fluid communication with a second chamber, and a drain connected to a fuel dump and in communication with a third chamber;

a valve seat element disposed between said outlet and said drain; said valve seat having spring biasing means associated therewith to bias said valve seat towards said first chamber and positioning means to hold and position said valve seat to a predetermined position within the valve body;

a valve element controlling fuel flow between the three chambers said valve element having an enlarged head located within said second chamber, said valving element being normally biased into a first closed position blocking said first chamber from said second chamber which prevents flow from said inlet to said outlet and allows flow between said second and said third chamber, and a second open position wherein said valve element is in contact with said valve seat blocks said second chamber from said third chamber and allows fuel flow from said inlet through first chamber to said second chamber and out said outlet;

means to move said valve element from said first position to said second position into contact with said valve seat.

4,175,588

AIR PRESSURE BRAKE ARRANGEMENT FOR TRACTOR AND SEMI-TRAILER COMBINATIONS

Robert M. Gute, Corunna, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Division of Ser. No. 790,309, Apr. 25, 1977, Pat. No. 4,088,374. This application Dec. 16, 1977, Ser. No. 861,375
Int. Cl.[2] F16K *11/02*
U.S. Cl. 137—625.4 3 Claims

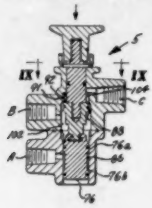
1. A three port valve comprising:

a housing, and a plunger movable lengthwise of a rectilinear passageway formed by said housing, said plunger having a handle supported exteriorly of the housing;

said passageway having, in the order named, a first portion

nearest the handle of smallest diameter, a second portion of intermediate diameter, a third portion of largest diameter, and a fourth portion furthest from said handle of said intermediate diameter, said third portion having radial and longitudinally extending flutes at opposite ends thereof which do not extend radially inwardly beyond cylindrical projections of the second and fourth passageway portions; said housing forming three ports spaced along said passageway and extending laterally therefrom, said ports being separately contiguous with said second, third and fourth passageway portions;

said plunger having a first portion complementary in diameter to said first passageway portion, a second portion having a diameter approximately that of said intermediate passageway diameter defining an end surface adapted to



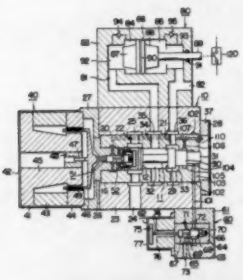
seat against a shoulder defined by the junction of said first and second passageway portions and adapted by the length of the first plunger portion to reciprocate into the third passageway portion beyond the second passageway portion, a third plunger portion spaced from the second plunger portion to reciprocate from a position wholly within said third passageway portion to a position within said fourth passageway portion, and a fourth plunger portion separated from said third plunger portion by a neck and spaced from the third plunger portion to reciprocate in a section of the fourth passageway portion beyond said port thereof; said plunger being articulated in a section thereof connecting the second and third plunger portions and comprising lost motion connecting means enabling lateral adjustment of the first and second plunger portions relative to the third and fourth plunger portions.

4,175,589

FLUID PRESSURE DRIVE DEVICE

Ichiro Nakamura, Katsuta; Ken Ichiryu, Mito, and Masatoshi Kuwayama, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 26, 1977, Ser. No. 800,948
Claims priority, application Japan, Jul. 28, 1976, 51-89177
Int. Cl.[2] F15B *13/043*
U.S. Cl. 137—625.64 **10 Claims**



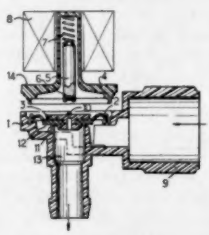
1. A fluid-pressure drive device comprising a plurality of drive portions which are operated in sequence including a primary drive portion and a secondary drive portion responsive to the operation of said primary drive portion, said primary drive portion including a sleeve and said secondary drive portion including a spool, said spool having first and second opposed fluid pressure bearing surfaces for driving said spool between a first position and a second position, fluid pressure on said first fluid pressure bearing surface resulting in a first force urging said spool towards said first position, fluid pressure on said second fluid pressure bearing surface resulting in a second force urging said spool toward said second position, the areas of said first and second fluid pressure bearing surfaces and the fluid pressure applied thereto being such that said first force is greater than said second force whereby said spool is maintained in said first position, first fluid passage means for providing fluid pressure to said first fluid pressure bearing surface, second fluid passage means for providing pressure fluid to said second fluid pressure bearing surface, third fluid passage means for relieving the pressure of fluid against said first fluid pressure bearing surface in response to operation of said primary drive portion whereby said spool is driven from said first position to said second position, the sleeve of the primary drive portion and the spool of said secondary drive portion being in telescoped relation so as to allow the length of fluid passages in said device to be relatively short whereby a relatively high operational speed of said device can be attained and wherein said primary drive portion forms part of a pilot valve means of said device and said secondary drive portion forms part of a control valve means of said device, and wherein operation of said primary drive portion closes said first fluid passage means and opens said third passage means to relieve the pressure of fluid against said first fluid pressure bearing surface whereby said spool is driven from said first position to said second position.

4,175,590

ELECTRIC VALVES

Gerard Grandclement, Cap d'Ail, France, assignor to International Cold Forging Corporation, Monaco

Filed Jul. 18, 1977, Ser. No. 816,335
Claims priority, application Monaco, Jul. 20, 1976, 1206
Int. Cl.[2] F16K *27/10, 31/40*
U.S. Cl. 137—883 **11 Claims**



1. An electric valve comprising a casing which has an inlet and an outlet connection, a seat for a membrane, a magnetically actuated valve shutter, a flexible, impervious membrane, clamped at its periphery, and an insert tightly held in the midportion of said membrane and having a hole therethrough, said membrane being in contact with said seat so as to define with the casing and the insert a control chamber which communicates with the outlet connection by said hole provided in said insert, which hole is normally closed by said valve shutter, said control member also communicating with the inlet connection by a restricted passage, and magnetic means for actuating said valve shutter so that it disengages from the hole, and further comprising the improvement which consists in that:

said casing is made of a first portion and a second portion both made of the same thermoplastic material, said first portion being shaped as a valve body and said second portion being shaped as a cap for said valve body shape

and defining said control chamber with said membrane and said insert thereof and also supporting said valve shutter and said magnetic actuating means;

said control chamber, outlet connection, membrane, insert and actuator have an axis common to surface-of-revolution shaping of each of them;

said membrane has an annularly cylindrical peripheral rim having at least one cylindrical surface substantially coaxial with said axis and said rim is restrained in a radial direction by a cylindrical surface of one of said casing portions likewise coaxial with said axis; and

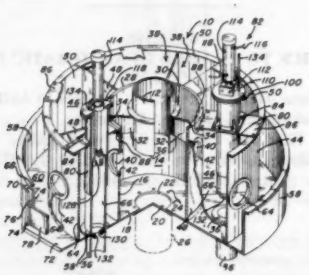
said first and second portions respectively have opposite stepped portions where they meet which are formed by cylindrical riser surfaces coaxial with said axis offset radially by surfaces perpendicular to said axis, two opposed pairs of said step riser surfaces being overlapped and fused by ultrasonic thermomechanical bonding under axial forcing together of said portions by reason of the diameter of the external riser surface of the casing portion that fits inside the other casing portion at their joint being slightly greater than the internal diameter of the internal riser surface of said outer casing portion at the joint, said two pairs of fused step riser surfaces being separated by an intermediate pair of said step riser surfaces of said respective casing portions which are separated from each other by the width of a pair of said radially offsetting surfaces likewise separated from each other, so that an annular cavity is formed thereby which is at least partially filled with material squeezed out from at least one of the fused overlaps of said adjacent opposed pairs of riser surfaces of said respective casing portions,

whereby axially and radially offset tandem sealed annular bonds are provided joining said first and second casing portions and seal said casing peripherally independently of the manner in which said membrane is held therein.

4,175,591
APPARATUS FOR DISTRIBUTING SLURRIES

Merrill Welker, Denver, Colo., assignor to Humphreys Engineering Company, Denver, Colo.

Filed Sep. 12, 1977, Ser. No. 832,421
Int. Cl.[2] G01F *11/32*
U.S. Cl. 137—883 **19 Claims**

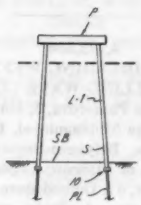


1. A stationary slurry distributor which comprises: a horizontally-disposed base; first wall means supported on said base cooperating therewith to define an open-topped reservoir effective to receive and retain a slurry delivered thereto; second wall means surrounding said first wall means in spaced relation outside thereof cooperating therewith and with said base to define a chamber encircling said reservoir; partition walls dividing the interior of said chamber into a plurality of individual compartments; the portions of said base underlying each compartment having a discharge opening therein, the portions of said first wall separating each compartment from the reservoir containing an inlet opening, the portions of said second wall within each compartment containing bypass means, and said bypass means and inlet opening within each compartment being angularly-offset relative to one another such that the slurry entering said compartment from the reservoir will essentially all leave the latter through said discharge opening when it is open; and, stopper-type valve means within each compartment selectively and independently operable to plug and unplug the discharge opening therein.

4,175,592
TUBULAR MEMBER SEAL ENCLOSING AND ENCLOSURE RELEASING APPARATUS

Malcolm G. Coone, Houston, Tex., assignor to Lynes, Inc., Houston, Tex.

Filed Sep. 18, 1978, Ser. No. 943,596
Int. Cl.[2] E02D *5/00;* **F02B** *17/04*
U.S. Cl. 138—89 **7 Claims**



1. A combination tubular member seal enclosing and enclosure releasing apparatus, comprising: elastomeric sealing means having interior and exterior edges, the interior edge thereof being disposed immediate one end of said tubular member and engaged therearound for sealing across the interior of said tubular member; first and second flange members initially defining a housing for securement of the interior edge of said sealing means, said flange members being cicumferentially extendible within said tubular member; first and second seal extending means having an end thereof secured to a respective flange member; telescoping piston means comprising a piston housing having a port therein and a piston element slidably disposed with respect to said housing, one of said seal extending means having another end thereof engaged with one of said piston housing and said piston element and the other of said seal extending means having another end thereof engaged with the other of said piston housing and said piston element; piston chamber means between said piston housing and said piston element for initial fluid pressure expansion between said piston housing and said piston element; plug means initially sealingly disposed within and selectively disengageable from said port; and means for selectively disengaging said plug from said port for telescopically expanding said piston means to urge and release at least one of said first and second flange members away from and out of securement with said elastomeric sealing means.

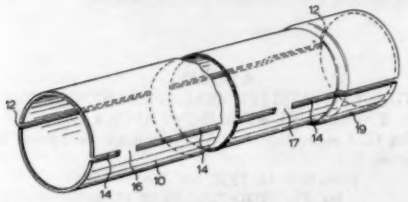
4,175,593
SPLIT DUCT WITH INTEGRAL HINGE

Stanley F. Sack, St. Andrews East, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Dec. 28, 1976, Ser. No. 755,109
Int. Cl.[2] F16L *57/00*
U.S. Cl. 138—110 **11 Claims**

1. A tubular duct suitable for installation upon an existing cable run, said duct being axially elongated and constructed from a resilient self supporting glass fiber reinforced plastic material and characterized by a first wall portion thereof being axially slit along the length of said duct, and a second wall portion generally radially opposed to said first wall portion being weakened by providing therein at least three axially aligned slots extending along about 90 to 99 percent of the axial

length of said duct to form a pair of spaced apart integral hinges whereby said duct may be resiliently opened along the



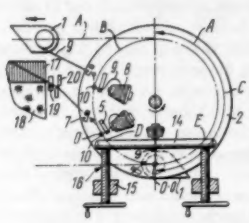
length thereof to permit the introduction of said cable therein through said slit.

4,175,594

APPARATUS FOR THREADING WEFT CARRIERS FOR TRAVELLING-WAVE LOOM

Eduard A. Onikov, ulitsa Panferova, 5, korpus 2, kv. 106; Alexandr L. Galperin, ulitsa Moldagulovoi, 10, korpus 3, kv. 166; Alexandr A. Zabotin, Belyaevo-Bogorodskoe, kvartal 45, korpus 26, kv. 87, all of Moscow; Evgeny D. Loschilin, Kashirskoe shosse, 36, kv. 87, Domodedovo Moskovskoi oblasti, and Nikolai I. Kolobanov, Leninsky prospekt, 94a, kv. 54, Moscow, all of U.S.S.R.

Filed May 3, 1978, Ser. No. 902,548
Int. Cl.[2] D03D *47/26*
U.S. Cl. 139—436 **2 Claims**



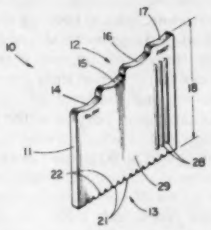
1. In an apparatus for threading weft carriers for a travelling-wave loom, wherein the carriers are conveyed along a closed trajectory, comprising: a rotatable disk arranged in a horizontal plane above a part of the closed trajectory of movement of the carriers and having upper and lower sides, said disk adapted to be rotated; winding members mounted on the under side of said rotatable disk, with a trajectory of movement thereof converging with and becoming vertically aligned, as the disk rotates, with that portion of the trajectory of movement of the carriers wherein the latter are being threaded, whereby prior to the trajectories converging and becoming vertically aligned, a zone is formed wherein said winding members encounter the carriers; grips for the end of the weft thread, mounted on the under side of said disk near said winding members; a package holder mounted on the upper side of said disk and adapted to accommodate the weft thread packages; grips for the weft thread, located on the upper side of said rotatable disk and intended for fixing the weft thread running from the package after the carriers have been threaded; the improvement comprising apparatus for controlling the length of the cut end of the weft thread including means for conveying the weft thread in a direction opposite to the movement thereof in the process of threading, designed for forming a short end protruding from the grip for the end of the weft thread and formed by a rod located over said disk at a position such that the weft thread encounters said rod prior to the point at which said trajectories converge and become vertically aligned to convey the thread upwardly through the disk; the rod of said conveying means being stationary above said disk beneath said grip of the weft thread and being located in the zone wherein the carriers encounter the winding members so that in plan the rod intersects the trajectory of movement of said winding members at two points, one of the points being located in front of the region of coincidence of the trajectories and the other, above the region of coincidence of the trajectories.

4,175,595

GASOLINE FLOW CONTROL DEVICE AND METHOD FOR USING SAME

Frank H. Noe, 8105 Conarroe Dr., Indianapolis, Ind. 46278

Filed Sep. 22, 1977, Ser. No. 835,578
Int. Cl.[2] B65B *3/04;* G05G *5/06*
U.S. Cl. 141—1 **5 Claims**



1. A gasoline flow control device for regulating the flow of gasoline through a gasoline pump handle, comprising:

(a) a body having an upper and a lower spaced-apart surface thereon, the upper surface having a plurality of concave steps therein varying in distance from the lower surface of said body, the lower surface on said body including a plurality of ridges and valleys cut therein to better grip the trigger guard on a gasoline pump handle; and

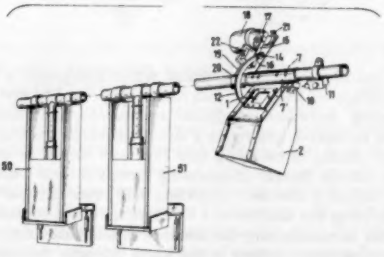
(b) means for positioning said body between a trigger and a trigger guard on a gasoline pump handle to regulate the flow of gasoline therethrough, the ridged lower surface on said body contacting the trigger guard with the trigger resting against one of the concave steps on the upper surface thereof.

4,175,596

STOP DEVICE TO BE USED IN AUTOMATIC FEEDING SYSTEMS

Niels Jørgensen, Herning, Denmark, assignor to Aktieselskabet Funki Maskinfabrik, Herning, Denmark

Filed Jan. 23, 1978, Ser. No. 871,461
Claims priority, application Denmark, Dec. 1, 1977, 103/77
Int. Cl.[2] B65B *3/28;* A01K *5/02*
U.S. Cl. 141—18 **14 Claims**



1. A stop device for use in automatic animal feeding systems which include a series of successive feed dispensers communicating with a common conveyor conduit, means for transporting animal feed through said conduit for successive distribution to each of said feed dispensers, and drive means for driving said

transporting means within said conveyor conduit at timed intervals.

said stop device comprising a container operatively associated with said conveyor conduit and positioned downstream of the last feed dispenser for detecting the completion of the distribution of a selected amount of feed to said feed dispensers,

means mounting said container for movement between an inactive position, a stop position, and a discharge position,

said container, in said inactive position, communicating with the interior of said conveyor conduit and being positioned to receive feed gradually from said conveyor as said feed is moved by said transporting means,

said container being adapted to move from said inactive position to said stop position in response to the accumulation of a selected quantity of feed therein,

switch means operatively connected to said drive means for deenergization thereof upon actuation of said switch means, said switch means being positioned to be engaged and actuated by said container when the latter moves to its stop position, and

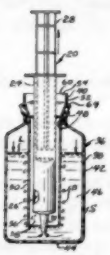
power driven means coupled to said container for moving the latter from said stop position to said discharge position in which said accumulated feed is emptied from said container.

4,175,597

IRRIGATION SOLUTION DEVICE

James J. Peterson, Palatine, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Aug. 1, 1977, Ser. No. 820,512
Int. Cl.[2] B65B 3/32
U.S. Cl. 141—23 **12 Claims**



1. An irrigation solution device, comprising:

a syringe having a barrel and a tip;

a container having sidewalls and a lower wall defining a solution receiving chamber, and an opening adjacent an upper portion of the container, said chamber containing a sterile irrigation solution;

an elongated barrier member having a first outer opening, an inner end portion defining a second opening, and a channel to receive said syringe, said barrier member being insertable through the container opening into an operative position with the inner end portion of the barrier member located adjacent the container lower wall and with said second opening of the barrier member communicating with the container chamber, said channel having a width slightly larger than the syringe barrel to closely receive the syringe barrel while permitting passage of air between the atmosphere and the second opening, said barrier member having a sufficient length to substantially cover the syringe barrel when positioned in said channel, said barrier member being removed from the container and said syringe being removed from the barrier member with said barrier member having a closure member releasably attached to an outer end portion of the barrier member and closing said second opening of the barrier member from the atmosphere; and

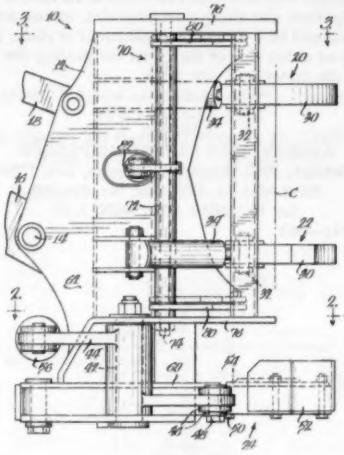
means for sealingly engaging the barrier member to the container in said container opening responsive to insertion of the barrier member into the container to said operative position, whereby said barrier member may be inserted into the container to said operative position with the inner end portion of the barrier member in said solution and with said closure member attached to the barrier member to form an air column in the barrier member channel and a lower level of the solution adjacent said second opening, the closure member may be removed from the barrier member to expose said channel, and said syringe may be inserted into the channel to form a sterile solution containing device.

4,175,598

APPARATUS FOR FELLING AND ACCUMULATING TREES

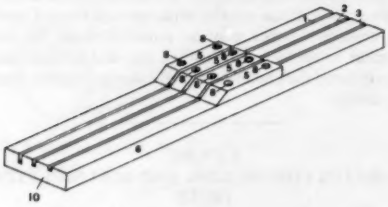
Terry A. Stoychoff, Schofield, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed May 12, 1978, Ser. No. 905,137
Int. Cl.[2] A01G 23/08
U.S. Cl. 144—34 E **6 Claims**



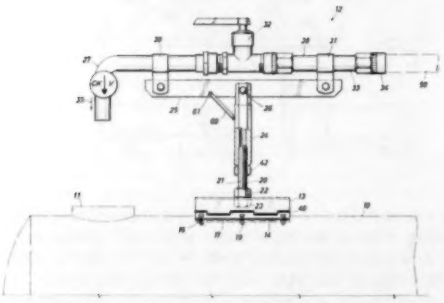
1. A tree harvester head for cutting and accumulating trees comprising a frame having a cutter supported thereon in a cutting area and an accumulator area above said cutter located between a base of said frame and the cutting area, means for actuating said cutter, accumulator arm means on said frame for holding trees in the accumulator area, drive means for moving said accumulator arm means between open and closed positions respectively opening and closing the accumulator area, said accumulator arm means including first and second arms respectively pivoted on first and second pivot axes on said frame on opposite sides of said accumulator area, said arms having arcuate peripheral surfaces respectively spaced from said pivot axes which terminate in tips having a predetermined dimension from said pivot axes and in which said predetermined dimension for each arm defines a minimum spacing between each arcuate surface and its associated pivot axis, grapple arms pivoted on said frame, said grapple arms extending away from said frame and having free ends spaced from said accumulator arm means, and pivoting means for pivoting said grapple arms to positively grip a growing tree between said accumulator arm means and grapple arms with said accumulator arm means in a closed position to retain accumulated trees in the accumulator area and said accumulator arm means being movable to an open position after the growing tree is severed to allow said grapple arms to move said tree into the accumulator area.

4,175,599
BALSAWOOD STRIPPER
Eugene Dubois, P.O. Box C, Acushnet, Mass. 02743
Filed Apr. 11, 1978, Ser. No. 842,742
Int. Cl.[2] B27C *1/14*; B27L *7/00*
U.S. Cl. 144—175 **7 Claims**



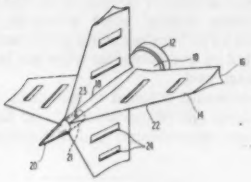
1. A strip cutting device comprising a base having a face with a plurality of substantially parallel slots in said face for guiding work therealong, said slots being of different depth, a cutter disposed over said slots intermediate the ends of the slots for cutting work slid along a selected slot, means detachably mounted on said base for holding said cutter in place, said slots extending on either side of the cutter for guiding the work to and from the cutter.

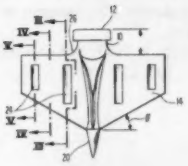
4,175,600
ANTI-SYPHON SAFETY DISPENSER
Sherwin Wallick, 5012 Westbriar, Houston, Tex. 77056
Filed May 11, 1978, Ser. No. 904,880
Int. Cl.[2] B65B *3/04*; B67C *3/00*
U.S. Cl. 141—363 **3 Claims**



1. An improved fluid dispenser comprising a base plate adapted to be connected to a fluid receiving tank having a feed opening, a pedestal member extending upwardly from said base plate, a collar member in surrounding relationship to said pedestal member and adjustably mounted with respect thereto, a carriage assembly including a fluid feed line attached to the upper end of said collar member, valve means in said feed line to control the flow of fluid therein, said collar member being vertically adjustable on and revolvably mounted with respect to the pedestal member by means of corresponding and mating screw threads on each of said collar member and said pedestal member, means for pivotally mounting said carriage assembly to the upper end of said collar member, said carriage assembly including a pair of bracket members attached thereto and in surrounding relationship to said feed line, said feed line including a hose connector means at one end thereof, said feed line further including a spigot having a check valve therein at the other end thereof, a pair of spaced locking nuts in surrounding relationship to said pedestal member and interposed between said base plate and said collar member, one of said pair of locking nuts being located adjacent said base plate and the other of said locking nuts being located adjacent said collar member to vertically adjust said collar member on said pedestal member, said base plate being channel-like in configuration and including a pair of flange members with each of said flange members having bar means in association therewith for extending into openings in said fluid receiving tank to mount said dispenser on said tank, and wherein said flange members are hinged to said base plate to accomodate different sized fluid receiving tanks.

4,175,601
HAND-HELD WEDGE TOOL FOR SPLITTING WOOD
Gustave C. Meyer, III, P.O. Box 187, Pottstown, Pa. 19460
Filed Jan. 30, 1978, Ser. No. 873,595
Int. Cl.[2] B26B *23/00*
U.S. Cl. 145—1 R **9 Claims**





1. An improved hand-held tool for splitting wood billets, comprising:

a plurality of blades extending outwardly from a central root area, said blades being spaced one from the other by substantially equal increments;

each of said blades having a sharp leading edge and a trailing edge, said leading edges having substantially identical rake angles in the range of from 15° to 50°;

an enlarged head upstanding from the juncture of said trailing edges of said blades for receiving blows from hand-held striking implements;

the flanks of each of said blades having a non-uniform taper whereby substantially the leading half of each blade, seen at its inward extremity, having a first small taper of from zero to 6°, and substantially the trailing half of each blade, seen at its inward extremity, having a second taper substantially greater than the taper of said leading half;

said flanks being substantially symmetrical about the center of each blade, and each said blade having a rectangular cross-section in a horizontal plane; and

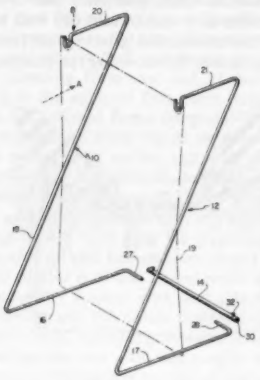
a locating point extending from the leading edge of said central root area.

4,175,602
BAG HOLDER AND DISPENSER
Michael T. Cavalaris, 1733 Nebraska Ave., Palm Harbor, Fla. 33563, and Michael E. Spanondis, P.O. Box 1547, Tarpon Springs, Fla. 33589
Filed Jun. 9, 1978, Ser. No. 914,214
Int. Cl.[2] A45C *13/00*
U.S. Cl. 150—3 **7 Claims**

1. In combination a flexible bag having a mouth, and a frame means for supporting said bag and holding said mouth in an open position to facilitate the loading of articles through said mouth into said bag, the improvement comprising:

said frame means including a pair of side frames with support means for holding said bag at two diametrically opposed positions on said bag mouth;

transverse linkage means between said side frames;



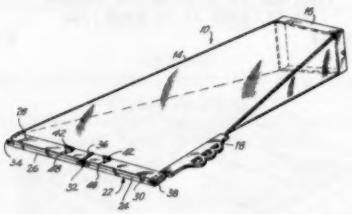
pedal means associated with said transverse linkage means for pulling said side frames toward each other in response to an actuating force on said pedal means to thereby bow open said bag mouth.

4,175,603

GRASS BAG CLAMP AND SPREADER

Albert Iaboni, and Biagio Iaboni, both of 89-27 198th St., New York, N.Y. 11423

Filed May 31, 1977, Ser. No. 802,120
Int. Cl.[2] B65D *33/16*
U.S. Cl. 150—4 **2 Claims**



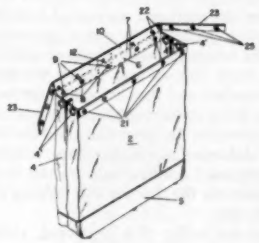
1. In a waste bag for mounting on lawn mowers and the like and including an elongated sleeve formed with first and second openings on opposed ends thereof and a first fixed frame mounted in said first opening for defining an entrance to said waste bag, the improvement comprising a second selectively openable and closable frame mounted in said second opening for selectively opening and closing said second opening to define an exit from said sleve, said second frame comprising first, second, third and fourth elongated members, hinge means joining said first member to said second and fourth members and said third member to said second and fourth members at their respective ends to define a parallelogram-shaped opening selectively closable so that said first and second members and said third and fourth members are in facing relation when said second frame is in a closed position; and means for releasably securing said second frame in its closed position, said securing means including a first twist-nut means extending through an aperture in said first member and formed with a pair of laterally extending heads in spaced relation on opposed sides of said first member, said securing means further including a second twist-nut means extending through an aperture in said fourth member and formed with a pair of laterally extending heads in spaced relation on opposed sides of said fourth member, the head of said first twist-nut means facing said second member when said second frame is in its closed position, said head of said first twist-nut means having one lateral dimension greater than another lateral dimension, the head of said second twist-nut means facing said third member when said second frame is in the closed position, said head of said second twist-nut means having one lateral dimension greater than another lateral dimension, said second member being formed with an opening positioned and dimensioned to receive said facing head of said first twist-nut means when said second frame is in its closed position, said third member being formed with an opening positioned and dimensioned to receive said facing head of said second twist-nut means when said second frame is in its closed position, each said opening being shaped so that the head of the associated twist-nut means passes through the opening at one rotational orientation of the associated twist-nut means and is prevented from passing through the opening at another rotational orientation of the associated twist-nut means to effect positive locking for retaining said second frame in its closed position.

4,175,604

TAMPER PROOF SECURITY MAIL AND BANK COLLECTION BAG

Cletus D. Bonner, 328 Beaver St., Beaver, Pa. 15009

Filed Nov. 7, 1978, Ser. No. 958,374
Int. Cl.[2] B65D *33/34*
U.S. Cl. 150—15 **7 Claims**



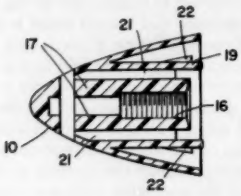
1. A tamper proof security mail and collection bag comprising front and rear wall panels, inwardly foldable gussets forming end walls, flat strip means secured to the mouth end of said front wall and having spaced flat reinforcing plate means associated therewith to enable hinging of said strip means in the mid section thereof, flat strip means secured to the mouth end of said rear wall, flat foldable flap means formed on said rear strip means having reinforcing plate means associated therewith, spaced apertured pins mounted on said flap means and projecting angularly therefrom, wing members foldably connected to said flap means and extending laterally from opposing ends thereof, reinforcing plate means associated with said members, spaced apertures in said front and rear strip means, gussets and wing members whereby when said mouth is closed, said flap means is single folded over said front strip means to project said pins through the apertures in both of said strip means, and said wing members are folded inwardly relative to said strip means with said pins projecting through the apertures therein, and locking means associated with at least one of said apertured pins for flatly closing and securing the mouth end of the bag against tampering and unauthorized opening, and whereby when said mouth is open said reinforced front strip means will hinge midway and be movable outwardly to form an enlarged generally V-shaped opening.

4,175,605

PROPELLER NUT

Gary E. Johnson, Alameda, Calif., assignor to Johnson Propeller Company, Oakland, Calif.

Filed Dec. 23, 1977, Ser. No. 863,731
Int. Cl.[2] F16B *39/284;* B63H *5/06*
U.S. Cl. 151—7 **2 Claims**



1. A one-piece self locking propeller nut for retention of a marine propeller on a threaded propeller shaft, comprising:

an outer housing having a front end and a back end;

an inner body within the outer housing, including a central threaded bore adapted to be screwed onto the threaded end of a propeller shaft, said threaded bore having threads which taper from a larger diameter near the front end of the housing to a smaller diameter inside the housing;

the inner body and the housing being integrally connected at the back end of the inner body, said inner body being generally cylindrical with its axis as the central axis of the nut, and being recessed from the front end of the nut, and web means integrally connecting the outside of the inner body with the inside of the housing, said web means including means spaced radially outwardly from the inner body for bearing against the back face of a sleeve member positioned on the shaft and associated with the propeller, whereby, when the propeller nut is screwed tightly onto the shaft, the bearing means of the propeller nut pushes against the back face of said sleeve member associated with the propeller, and the threaded inner body exerts an axial pulling force on the propeller shaft threads, with said web means between the inner body and the bearing means springingly deformed to a slight extent, so that said pulling force is maintained continuously on the threads, adding further friction on the threads and helping retain the nut on the shaft; and

said one-piece nut being of a non-rigid, yieldable plastic material;

whereby said threads retain the nut tightly on the shaft, resisting vibrational forces which tend to loosen a propeller nut.

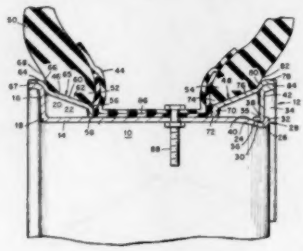
4,175,606

ASSEMBLY FOR MOUNTING TUBELESS TIRES

Clifford E. Bailey, 201 E. Ellis St., Jefferson City, Tenn. 37760, assignor to Clifford E. Bailey, Jefferson City, Tenn.

Filed Apr. 28, 1977, Ser. No. 791,734
Int. Cl.[2] B60C *7/24*
U.S. Cl. 152—399 **10 Claims**

1. In an apparatus for mounting tube type tires on a conventional wheel rim having a substantially cylindrical wall, said rim wall including a first annular flange integrally formed with said rim wall and radially projecting from the first axial end portion thereof, said rim wall defining at its opposite axial end, a circumferential groove offset from said further end of said rim wall by a shoulder, an assembly for mounting a tubeless type tire having a pneumatic inner tube disposed therein, said tubeless tire including companion beads, each of said beads having a sloped base integrally formed with said wall of said bead, said assembly including: a first annulus having an internal diameter substantially equivalent to the external diameter of said cylindrical rim wall whereby said first annulus can be telescoped on said rim and moved into engagement with said first annular flange, said first annulus defining a seating surface for receiving one bead of said tubeless tire, and a further annulus having an internal diameter substantially equivalent to the external diameter of said cylindrical rim wall, whereby said further annulus can be telescoped onto said cylindrical rim wall at said opposite axial end of said rim wall to a position inwardly of said circumferential groove, said further annulus defining a seating surface for receiving the companion bead of



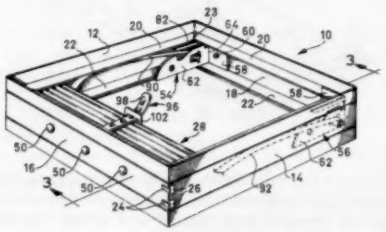
said tubeless tire, and annulus locking means having an internal diameter less than the external diameter of said cylindrical rim wall, said annulus locking means being split and adapted for being expanded over said rim wall shoulder and for seating in said circumferential groove such that said locking annulus means lockingly engages said opposite axial end of said rim thereby preventing movement of said further annulus axially outwardly of said rim.

4,175,607

LATCH PLATE

James R. Tatum, 20 Winterton Dr., Islington, and Barry R. Dayus, 2021 Ardleigh Rd., Oakville, both of Canada

Filed Apr. 24, 1978, Ser. No. 899,284
Int. Cl.[2] E05F *15/20;* E06B *3/94*
U.S. Cl. 160—1 **8 Claims**



1. A fire damper comprising;

a quadrilateral frame having first and second mutually parallel side walls and, generally perpendicular thereto, first and second mutually parallel end walls, each of said side walls and said end walls being provided with inwardly projecting first and second guide flanges disposed respectively in mutually spaced apart first and second planes;

a shutter comprising a plurality of pivotally interconnected blade members extending between said side walls of said frame between said first and second guide flanges thereof, said shutter being terminally anchored to said first end wall of said frame for movement between an open position in which said blade members are disposed in a folded concertina-like configuration near said first end wall of said frame and a closed position in which said shutter extends completely between said first and second end walls of said frame to close said frame, said shutter being guided during such movement between said first and second guide flanges on each of said side walls;

two unitary latch plates, one at each side of said frame, and fastened to said second end wall thereof, each said latch plate comprising an end flange secured to said second end wall of said frame in proximity to said first side wall thereof; an essentially planar side flange integrally formed with said end flange, projecting therefrom in generally parallel disposition to but spaced apart inwardly from an adjacent said side wall of said frame, and having an edge surface extending from one end of said side flange in proximity to the adjacent first guide flange on said adjacent side wall of said frame progressively and angularly toward said second guide flange on that side wall in the direction toward said second end wall of said frame for guiding a free end one of the blade members of said shutter during its movement into said closed position thereof, at least one notch being provided in said edge surface of said side flange of said latch plate for receiving a corresponding projection on said free end one of said blade members when said shutter is in said closed position thereof; and a tongue integrally formed with said side flange and projecting transversely therefrom toward said adjacent side wall of said frame extending along an axis parallel to the axis of said second end wall, said tongue being formed by stamping out a rectangular portion of said side flange, and being rooted thereto at one end and free at the other end, and being formed with an arcuate cross-section, having a semi-cylindrically shaped surface facing towards said second end wall;

a blade tension spring encircling said tongue of said latch plate and terminally secured at a free end thereof to said shutter to urge said shutter into said closed position thereof and said projection then into said notch; and

a thermally actuable catch mechanism on said frame and normally engaging said shutter to hold said shutter in said open position thereof against the action of said spring but releasable in the event of an increase in the temperature of said catch mechanism above a predetermined value to release said shutter and to allow said shutter to move into said closed position thereof under the action of said spring.

4,175,608

CLOSURE STRUCTURE, ESPECIALLY FOR OPENINGS IN A BUILDING

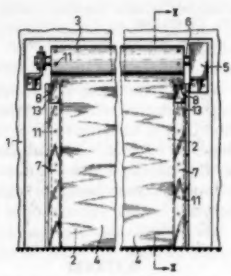
Kurt Alten, Ringstr. 14, 3015 Wennigsen, Fed. Rep. of Germany

Filed Feb. 14, 1978, Ser. No. 877,750

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1977, 2706233

Int. Cl.[2] E06B *9/20*

U.S. Cl. 160—273 R **16 Claims**



1. A closure structure especially for buildings, which includes: wall means comprising two substantially parallel vertical side wall sections spaced from each other in horizontal direction, and also comprising at least one horizontal wall section interconnecting said vertical side wall sections and defining therewith a wall opening, a closure member movable selectively upwardly and downwardly for respectively opening and closing said wall opening, lateral guiding means connected to said side walls for laterally guiding said closure member, said closure member having transverse passage means therethrough, latching means operable during the downward movement of said closure member from the outside of said guiding means to enter said transverse passage means and through the latter partly to enter said guiding means for cooperation with said guiding means to prevent said closure member to slip out of said guiding means, and means associated with said guiding means and operable in response to the upward movement of said closure member to bring about removal of said latching means from said passage means and said guiding means, motor driven reel means located near the upper end of said wall opening for winding said closure member up and off said reel means, a magazine arranged between said reel means and the upper end of one of said lateral guiding means for receiving and releasing said latch means, said magazine having an upper section with an entrance opening into said magazine, a stationary ejector arranged on said guiding means opposite said last mentioned opening for feeding latching means from said closure member into said magazine, said magazine having a lower section with a discharge opening for the latching means in said magazine, said magazine also being provided with a spiral chute leading from said entrance opening to said discharge opening, and said discharge opening having associated therewith a closing element normally closed and adapted to be opened in response to the downward movement of said closure member.

4,175,609

PROCESS AND APPARATUS FOR THE MOLDING OF SHAPED ARTICLES FROM A COMPOSITE METALLIC REFRACTORY MATERIAL

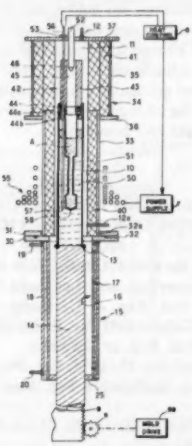
Maurice El Gammal, Clamart, and Maurice Rabinovitch, Chatillon, both of France, assignors to O.N.E.R.A. - Office National d'Etudes et de Recherches Aerospatiales, Chatillon, France

Filed Aug. 5, 1977, Ser. No. 822,261

Claims priority, application France, Aug. 11, 1976, 76 24539

Int. Cl.[2] B22D *25/06*

U.S. Cl. 164—60 **16 Claims**



1. A process for molding an article of complex shape from a composite metallic refractory material by a unidirectional solidification of the composite material in a mold, comprising the steps of:

(a) providing a bath of a heat-exchange liquid metal in the form of a substantially cylindrical column;

(b) heating an upper part of said column above the melting point of said composite material while cooling a lower part of said column below said melting point;

(c) fulling immersing a charge-receiving part of said mold in

said bath with the bottom of said mold at an intermediate level between said upper and lower parts at which the bath temperature substantially equals said melting point;

(d) maintaining the immersion of the mold in the bath throughout the process;

(e) introducing said composite material into the mold to form a charge therein heated by the surrounding bath above said melting point; and

(f) controlling the heating of said column to maintain the bath temperature at said intermediate level substantially at said melting point while progressively lowering said mold within the bath with reference to said intermediate level for continuously advancing a solidification front in the composite material from the bottom of said mold to the top of said charge.

9. An apparatus for molding an article of complex shape from a composite metallic refractory material by a unidirectional solidification of the composite material in a mold, comprising:

an upright container for a bath of heat-exchange liquid metal forming therein a substantially cylindrical column;

adjustable heat-generating means surrounding said container and including a heater for raising the temperature of an upper portion of said column above the melting point of said composite material and a cooler for maintaining the temperature of a lower portion of said column below said melting point, said heater and said cooler being vertically separated by a neutral zone;

temperature-sensing means in said neutral zone operatively coupled with said heat-generating means for establishing an intermediate level at which the bath temperature substantially equals said melting point;

mounting means for supporting a mold immersed in said bath, said mounting means being vertically movable with respect to said heat-generating means and said temperature-sensing means; and

drive means coacting with said mounting means for lowering said mold from a starting position, in which the bottom of said mold lies at said intermediate level, to an end position in which a charge formed in said mold from said composite material lies below said intermediate level, said column extending upwardly above said intermediate level to keep said charge fully liquefied in said starting position whereby a solidification front coinciding with said intermediate level advances continuously from the bottom to the top of the charge upon progressive lowering of the mold into said end position.

4,175,610

PROCESS AND APPARATUS FOR THE SEMICONTINUOUS PRODUCTION OF SILICON MOLDINGS

Helmut Zauhar; Bernhard Authier, both of Burghausen; Roland Luptovits, Emmerting, and Leonhard Schmidhammer, Kirchheim, all of Fed. Rep. of Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Fed. Rep. of Germany

Filed Jul. 17, 1978, Ser. No. 925,506

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1977, 2745247

Int. Cl.[2] **B22D** *15/00, 25/06;* **B22C** *9/20*

U.S. Cl. 164—60 **18 Claims**

1. A process for the semi-continuous production of silicon castings having a columnar structure composed of monocrystalline zones having a preferential crystallographic orientation, comprising the steps of:

(a) introducing a charge of silicon into an evacuable, vacuum-tight casting station, under an atmosphere which is inert with respect to silicon;

(b) introducing said silicon charge into an empty mold disposed in said casting station which is exposed to a vertically-oriented temperature gradient of 200° C. to 1,000° C. by means of a heating device and effecting the solidification of said silicon in said temperature gradient to produce a casting;

(c) transferring the mold and casting into a vacuum-tight transport chamber which communicates with said casting station;

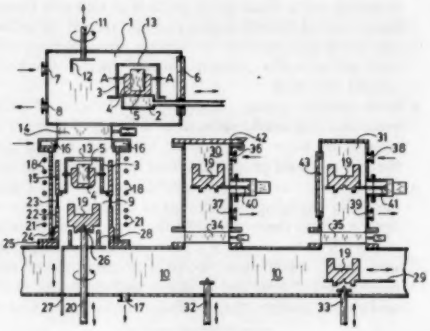
(d) transferring the mold and casting from said transport chamber into a cooling station which is connected to said transport chamber via a vacuum-tight valve means and cooling said casting and mold in said cooling station;

(e) withdrawing said casting and mold from said cooling station following cooling thereof while conveying an empty mold from a loading station via said transport chamber into said casting station; and

(f) repeating steps (a)–(e) in a cyclical manner so as to produce silicon castings in a semi-continuous manner.

8. Apparatus for the semi-continuous production of silicon castings having a columnar structure composed of monocrystalline zones having a preferential crystallographic orientation, comprising:

a vacuum-tight casting station which can be evacuated and which includes a vacuum-tight valve means;



a mold for receiving a molten charge of silicon which is movable in at least one spatial direction;

a holder for moving said mold in said at least one spatial direction;

a melting vessel disposed above said mold which is essentially resistant to silicon and which is configured and supported to permit release of a molten charge of silicon contained therein into said mold;

a transport chamber which communicates with said casting station and which includes means for moving said mold in at least two spatial directions;

inlet and outlet gas lines leading respectively, into and out from, said casting station and said transport chamber;

at least one cooling station which is connected to said transport chamber via a vacuum-tight isolation device and which includes an inlet and an outlet gas line for feeding a cooling gas therethrough and a holder for supporting a mold, said cooling station being isolated from the outside atmosphere via a further vacuum-tight isolation device.

4,175,611

PLASMA FLAME SPRAY COATED GRAPHITE DIES

John M. Fletcher, Sheffield, England, assignor to British Steel Corporation (Chemicals) Limited, England

Filed Apr. 27, 1978, Ser. No. 900,561

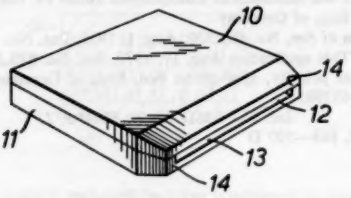
Claims priority, application United Kingdom, Apr. 28, 1977, 17804/77

Int. Cl.[2] **B05D** *3/06, 7/24;* **B32B** *15/04, 9/04*

U.S. Cl. 164—418 **9 Claims**

1. A method of producing a graphite die for use in continuous casting of non-ferrous metals, the graphite die having

wearing surfaces, said method comprising applying a first layer of aluminum or a mixture of aluminum and alumina and then



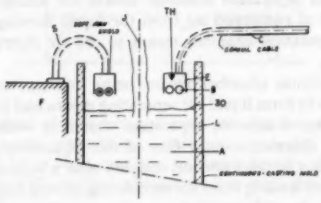
applying a second layer of alumina, both layers being applied by plasma or combustion flame spraying.

4,175,612

APPARATUS FOR MEASURING AND CONTROLLING THE LEVEL OF MOLTEN STEEL IN A CONTINUOUS-CASTING MOLD

Jean Baumert, Esch, Luxembourg, assignor to ARBED Acieries Reunies de Burbach-Eich-Dudelange S.A., Luxembourg, Luxembourg

Filed Nov. 15, 1977, Ser. No. 851,635
Int. Cl.² B22D *11/16, 1/02*
U.S. Cl. 164—449 **5 Claims**



1. The combination with a continuous-casting mold of an apparatus for controlling the level of liquid steel is said continuous-casting mold, said apparatus comprising:

an oscillator having a resonant network including a coil in said mold surrounding a stream of steel flowing into the mold, and a capacitor, said ascillator generating a frequency constituting a function of the location of the steel-melt surface within said mold;

circuit means connected to said oscillator for controlling the rate of feed of molten steel to said mold, said coil having a plurality of rigid turns supported and surrounded by a refractory material and disposed in the interior of said mold concentrically therewith in a horizontal plane;

an annular downwardly open static metallic crown receiving said coil and said refractory material and disposed in said mold above said surface, said crown is connected to a coaxial conductor forming intrinsically part of said capacitor and having a conductive member connected to said crown; and

means for supporting said coil within said mold from a location outside the latter and independently of movement of said mold.

4,175,613

METHOD OF STORING ENERGY

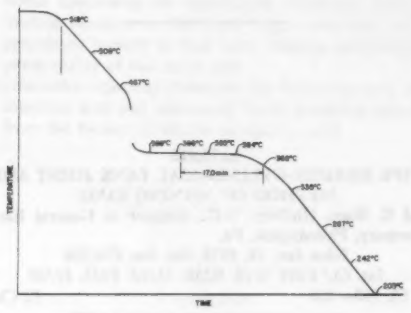
Talbot A. Chubb, 5023 N. 38th St., Arlington, Va. 22207

Division of Ser. No. 802,395, Jun. 1, 1977, Pat. No. 4,119,556. This application Jun. 30, 1978, Ser. No. 920,890
Int. Cl.² C09K *5/06*
U.S. Cl. 165—1 **7 Claims**

1. A method of storing thermal energy which comprises:

transfering thermal energy to a liquid, thereby causing said liquid to become a gas;

transporting said gas to a surface thermally connected to a thermal-energy storage material comprising a ternary salt mixture of sodium chloride, potassium chloride, and magnesium chloride in $NaCl:KCl:MgCl_2$ weight-ratio range of 22.5 to 26.5:18.5 to 22.5:53.0 to 57.0 and an additive salt selected from the class consisting of calcium, barium, and



strontium chloride, sodium, potassium, and magnesium bromide, sodium, potassium, and magnesium fluoride and mixtures thereof in an amount sufficient to reduce the melting point of said thermal-energy storage material below that of said ternary salt mixture and not to exceed 10 weight percent of the total composition; and

condensing said gas at said surface, thereby releasing thermal energy to said storage material.

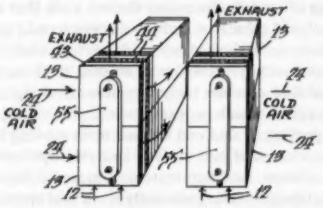
2. The method of claim 1 wherein said liquid is m-terphenyl.

4,175,614

HEAT EXCHANGER DEVICE

Homer D. Huggins, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.

Filed Jun. 1, 1978, Ser. No. 911,332
Int. Cl.² F28G *13/00*
U.S. Cl. 165—95 **6 Claims**



1. A heat exchanger device for recovering waste heat from a contaminated hot gas that carries solid and precipitable contaminants capable of being liquified by heat, comprising: a heat exchanger having a plurality of spaced heat conducting first passage means therethrough for said contaminated hot gas and a plurality of spaced heat conducting second passage means therethrough for a cooler second gas to be heated by heat exchange with said hot gas, said first passages and said second passages being interleaved for efficient heat transfer between the two gases; a heat conducting fin in each of said second passages for aid in transferring heat between said gases, each said fin comprising means for providing gas flow paths for said second gas, said interleaved first and second passages being defined at their sides by heat conducting sheets common to both passages on which the contaminants are deposited from said contaminated hot gas on the said first passages surfaces of

said sheets; and means for applying heat to said sheets that define the outer extremities of the outermost said second passages for heat transfer by way of said fins to the sheets defining said first passages in order to heat liquify contaminants deposited thereon.

4,175,615

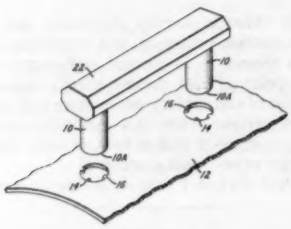
PIPE HEADER–CYLINDRICAL TANK JOINT AND METHOD OF JOINING SAME

Lloyd S. Blair, Hickory, N.C., assignor to General Electric Company, Philadelphia, Pa.

Filed Jan. 19, 1978, Ser. No. 870,916

Int. Cl.[2] **F28F** *9/18;* **B23K** *31/02;* **F16L** *41/08*

U.S. Cl. 165—106 **12 Claims**



1. A method of joining an end portion of a first tubular member to an arcuate surface, comprising the steps of:

(a) providing said end portion with an end surface which is substantially flat;

(b) providing a first aperture in said arcuate surface, said aperture having a configuration which closely matches at least a portion of said end surface of said tubular member and being related in dimension thereto such that said end portion of said tubular member adjacent to said matching end surface can be moved into said aperture when said end surface and said aperture are in aligned relation, another portion of said aperture including non-matching means of a configuration which prevents an end portion adjacent to another portion of said end surface from moving into said aperture when said end surface and said aperture are in aligned relation, said non-matching means comprising at least two tabs projecting inwardly from said aperture, said tabs being recessed with respect to the surrounding portion of said arcuate surface which defines said aperture, said two tabs being disposed in substantially opposed relation around said aperture, said tabs being effective when engaged by said end surface of said end portion to prevent movement of said end portion into said aperture;

(c) aligning said end surface of said end portion with said aperture, the aligning step including moving said matching portion of said end surface into said aperture and engaging said other portion of said end surface with said non-matching means of said aperture until said end portion is in a pivotal position in said aperture, said aperture configuration providing sufficient clearance to said end portion so that said end portion is transversely pivotable with respect to said arcuate surface; and

(d) joining said end portion to said arcuate surface.

4,175,616

EQUALIZATION TANK FOR COOLING LIQUID

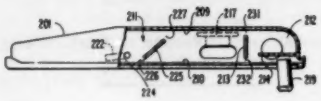
Rolf Pabst, Neuhausen, and Siegfried Jenz, Illingen, both of Fed. Rep. of Germany, assignors to Dailmler-Benz Aktiengesellschaft and Suddeutsche Kuhlerfabrik Julius Fr. Behr, both of, Fed. Rep. of Germany

Division of Ser. No. 601,330, Aug. 1, 1975, Pat. No. 4,064,848. This application Aug. 17, 1977, Ser. No. 825,373

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1974, 2437502

Int. Cl.[2] **F28D** *15/00;* **F01P** *3/22*

U.S. Cl. 165—107 D **7 Claims**



1. An equalization tank for volume equalization and air separation of a liquid heat carrier flowing through a circulating system, especially for a circulatory system for combustion engine cooling spaces and the like, comprising:

separation chamber means,

air chamber space means arranged above said separation chamber means,

venting means communicating the air chamber space means and the separation chamber means for accommodating escape of entrapped air from the liquid flowing through the separation chamber means to the air chamber space means,

the separation chamber means being constructed and arranged to form liquid-air separating means and including a plurality of separate separation chambers with partition means therebetween, a first of the separation chambers including an inlet portion coupled with a separation flow entrance leading from the circulating system and an outlet portion in said partition means coupled directly with a second of the separation chambers, the outlet portion being constructed of a lower connection near the tank bottom for permitting cooling liquid low in gas bubbles to flow therethrough from the first separation chamber to the second separation chamber, and an upper vent connection near the tank top, and

guide means arranged in a central zone of the first separation chamber and spaced between an opening of the inlet portion and the partition means for guiding cooling liquid enriched in bubbles in the direction toward the tank ceiling and said upper vent connection, and away from said lower connection.

4,175,617

SKEWED TURN COILED TUBE HEAT EXCHANGER FOR REFRIGERATOR EVAPORATORS

Thomas M. Hahn, Jeffersontown; Ivar Lohmus, Louisville, and David E. Oakley, Fairdale, all of Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 27, 1977, Ser. No. 864,367

Int. Cl.[2] **F28D** *7/02;* **F28F** *1/38*

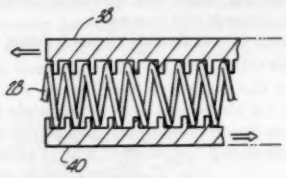
U.S. Cl. 165—122 **9 Claims**

1. A heat exchanger comprising:

a tube wound into generally helical coil, each of the turns in said coil being spaced apart and skewed at variable helical angles through each of said turns to present portions of each of said turns at varying degrees of obliqueness to a direction transverse to said coil axis;

a fin array comprising fins secured to said tube along the length thereof and extending in the general direction of the radius of said coil turns at the point whereat each of said fins is secured to said tube;

means for directing fluid through said coil in said transverse direction across said coil axis whereby increased fluid



flow contact with said fin array is achieved by said skewing of said turns into the path of said fluid flow.

4,175,618

HIGH VERTICAL AND HORIZONTAL CONFORMANCE THERMAL OIL RECOVERY PROCESS

Ching H. Wu, Golden, Colo.; Alfred Brown, Houston; Wilbur L. Hall, Bellaire, both of Tex., and Russell D. Shupe, Ponca City, Okla., assignors to Texaco Inc., White Plains, N.Y.

Filed May 10, 1978, Ser. No. 904,703
Int. Cl.[2] E21B *43/22, 43/23*
U.S. Cl. 166—252 **24 Claims**

1. A method of recovering viscous petroleum from a subterranean, viscous petroleum-containing, permeable formation penetrated by at least one injection well and by at least one production well, in fluid communication with the formation, comprising:

(a) injecting a thermal recovery fluid comprising steam into the formation and producing fluids from the formation via the production well for a predetermined period of time, thereby forming a steam-swept zone in the formation;

(b) injecting an emulsifying fluid into the steam-swept zone, said emulsifying fluid comprising water having dissolved therein a surfactant capable of forming a viscous emulsion with formation petroleum at the temperature and water salinity present in the steam-swept zone, said water containing the emulsifying surfactant forming a viscous emulsion in the steam-swept zone with residual petroleum present in that zone, thereby decreasing the permeability of that zone, said surfactant comprising an organic sulfonate selected from the group consisting of petroleum sulfonate having a median equivalent weight from 325 to 475, and syntheic sulfonates of the formula

RSO_3X

wherein R is an alkyl, linear or branched, having from 8 to 24 carbon atoms, or an alkylaryl including benzene or toluene having attached thereto at least one alkyl group, linear or branched, and containing from 6 to 18 carbon atoms in the alkyl chain, and X is sodium, potassium, lithium or ammonium; and

(c) thereafter injecting steam into the formation well via the injection well and recovering fluids including petroleum from the formation via the producing well.

24. A method of recovering viscous petroleum from a subterranean, viscous petroleum-containing, permeable formation penetrated by at least one injection well and by at least one production well, both wells being in fluid communication with the formation, comprising:

(a) injecting a thermal recovery fluid comprising steam into the formation and producing fluids from the formation via the production well for a predetermined period of time, thereby forming a steam-swept zone in the formation;

(b) injecting an emulsifying fluid into the steam-swept zone by means of the same well as was used for recovering petroleum, said emulsifying fluid comprising water having dissolved therein a surfactant capable of forming a viscous emulsion with formation petroleum at the temperature and water salinity present in the steam-swept zone, said water containing the emulsifying surfactant forming a viscous emulsion in the steam swept zone with residual petroleum present in that zone, thereby decreasing the permeability of that zone; and

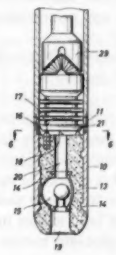
(c) thereafter injecting steam into the formation well via the injection well and recovering fluids including petroleum from the formation via the producing well.

4,175,619

WELL COLLAR OR SHOE AND CEMENTING/DRILLING PROCESS

Carl A. Davis, P.O. Box 12326, Houston, Tex. 77017

Filed Sep. 11, 1978, Ser. No. 941,166
Int. Cl.[2] E21B *33/16*
U.S. Cl. 166—291 **10 Claims**



1. In a well shoe or collar pipe attachment having a cement tube adapted to receive a pump down wipe plug, the improvement which consists of at least one drillable protrusion extending upward from the top surface of the cement tube, said protrusion having a sharp upper end capable of engaging, denting, penetrating and rending a pump down wipe plug and strong enough to withstand the torque exerted by the tendency of a pump down wipe plug to rotate when in contact with a rotating drill bit.

9. An improved well cementing and drilling process comprising:

(a) pumping wet cement into the well pipe string;

(b) inserting a top pump down wipe plug between the wet cement and a forcing fluid used to pump the wet cement to the desired level;

(c) pumping the plug and the wet cement down the well with the forcing fluid until the bottom of the plug contacts the top of a cement tube of a well shoe or collar pipe attachment having at least one drillable tooth-like means capable of engaging; denting, penetrating and rending said plug;

(d) allowing the cement to harden;

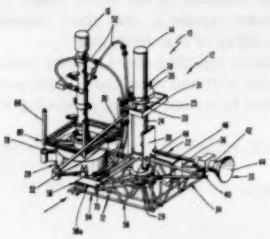
(e) contacting the top of the plug with a rotating drill bit so that the bottom of the plug is forced on to the tooth-like means thereby retarding the tendency of the plug to rotate and enhancing the drilling action of the bit on the plug.

4,175,620

METHODS AND APPARATUS FOR ANCHORING OFFSHORE PIPELINE

Clyde E. Nolan, Jr., Houston, and William S. Tillinghast, Humble, both of Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed Dec. 6, 1977, Ser. No. 857,981
Int. Cl.[2] E21B 7/12
U.S. Cl. 166—343 **20 Claims**



1. An offshore flowline installation assembly operable to receive pipeline means and comprising:

wellhead base means;

generally upright well conduit means projecting through said wellhead base means;

pipeline anchor means connected with said wellhead base to form therewith a unit that can be lowered onto a seabed;

said pipeline anchor means being shiftably positionable relative to said wellhead base means; and

pin pile means operable to secure said pipeline anchor means to the seabed so as to isolate said pipeline anchor means from said wellhead base means in relation to forces transmitted from said pipeline means to said pipeline anchor means;

said pin pile means defining generally upright pivot axis means about which said pipeline anchor means is rotatably shiftable; and

said pin pile means being anchoringly engaged with said seabed and connected in generally lateral force isolating relation with said pipeline anchor means in order to substantially prevent the transmission of lateral force from said pipeline anchor means to said generally upright well conduit means.

4,175,621

FRUIT DISLODGER FOR A HARVESTING MACHINE

David M. Seem, Seem Dr., Kutztown, Pa. 19530

Filed Aug. 25, 1977, Ser. No. 827,475
Int. Cl.[2] A01D 17/00, 45/00
U.S. Cl. 171—14 **5 Claims**

1. In combination with a tomato harvester having a main frame, cutting means for severing tomato plants below ground, and means for depositing the severed plants on a movable conveyor on which the tomatoes are separated from the vines,

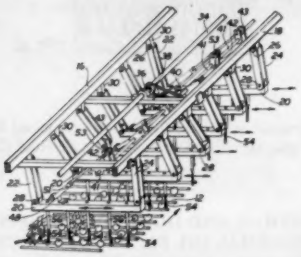
means for physically dislodging tomatoes from the vines as said tomato plants are being conveyed on said conveyor comprising:

(a) a pair of frame members connected to said main frame and extending longitudinally over said conveyor in the direction of movement of said conveyor,

(b) a plurality of cross bars connected to said frame members are disposed over said conveyor to swing back and forth out of the phase with one another transverse to the direction of movement of said conveyor,

(c) a plurality of flexible spring-like elements connected to each of said cross bars extending vertically downwardly towards said conveyor,

(d) the ends of said flexible elements being spaced from said conveyor, and



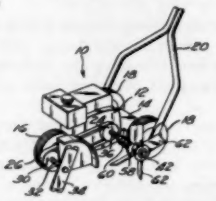
(e) means for moving said cross bars transversely back and forth across said conveyor to move said flexible elements into contact with said tomato plants as they are conveyed to assist in dislodging the tomatoes from said vines.

4,175,622

EDGER FAN APPARATUS

Conrad G. Summerfelt, 2161 Cooley Pl., Pasadena, Calif. 91104

Filed Jan. 23, 1978, Ser. No. 871,207
Int. Cl.[2] A01G 3/06
U.S. Cl. 172—14 **1 Claim**



1. In combination with an edger having a housing mounted on wheels for movement across hard, substantially planar surfaces such as cement sidewalks, a motor mounted on said housing, said motor causing rotation of an output shaft, a cutting blade driven by said output shaft, said cutting blade being adapted to cut vegetation located directly adjacent an edge of said hard, substantially planar surface, the improvement comprising;

fan means mounted on said housing in close proximity to said cutting blade but spaced therefrom, said fan means to be rotatably driven by power means;

said fan means including a plurality of separate fan blades, each said fan blade being formed of a flexible sheet material, each said fan blade being connected to a fan hub by means of a flexible connection, said hub comprising a spool forming an inner disc and an outer disc, each said fan blade being connected to both said inner disc and said outer disc, each said flexible connection permitting movement of its respective fan blade with respect to said hub within the plane of rotation of said fan means, whereby upon a fan blade contacting an exterior object such as a users hand or leg the fan blade will readily bend causing little or no injury to the user;

a shaft extension being fixedly mounted to said output shaft, said hub being slidably mounted upon said shaft extension, said hub having a forwardmost planar surface, a washer

member connected to said shaft extension having an inner planar surface, said forwardmost planar surface being in continuous frictional contact with said inner planar surface, said hub being normally rotatably driven with said shaft extension but capable of sliding movement in respect thereto upon encountering a restricting force; and

coil spring biasing means located between said hub and a stop means on said shaft extension, said blasing means exerting a continuous force against said hub to frictionally engage together said forwardmost planar surface and said inner planar surface to cause said hub to normally rotate with said shaft extension.

4,175,623

SOIL CULTIVATING IMPLEMENTS

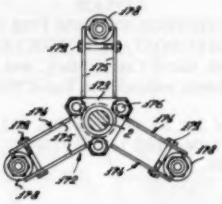
Cornelis van der Lely, 7 Brüschenrain, Zug, Switzerland

Filed Nov. 30, 1976, Ser. No. 746,088

Claims priority, application Netherlands, Dec. 1, 1975, 7513962

Int. Cl.[2] A01B *33/06*

U.S. Cl. 172—59 **8 Claims**



1. A soil cultivating implement comprising a plurality of soil working members mounted on corresponding upwardly extending shafts that define axes of rotation, at least one working member having support means comprising radially extending arms and downwardly extending tines mounted adjacent the outer ends of said arms, said tines extending generally parallel to the corresponding axis of rotation and said arms comprising planar strips of resilient material with respective widths that are substantially vertical, said tines and corresponding strips being deflectable in either of two opposite directions away from a normal equilibrium position, against the resilient opposition of said strips, and substantially perpendicular to the planes of said strips, at least one of said tines having a fastening portion and means mounting said fastening portion between the outer ends of said strips, said mounting means including clamping means and said fastening portion being supported between outer ends by the clamping means.

4,175,624

SOIL CULTIVATING IMPLEMENT

Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland

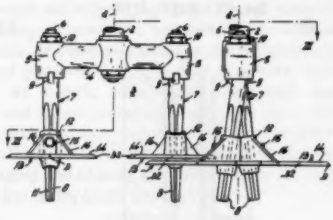
Filed Aug. 8, 1977, Ser. No. 822,661

Claims priority, application Netherlands, Aug. 9, 1976, 7608815

Int. Cl.[2] A01B *33/06*

U.S. Cl. 172—59 **19 Claims**

1. A soil cultivating implement comprising frame means and tined soil working members rotatably supported on said frame means, said members being mounted for rotating about corresponding upwardly extending axes, each member having two elongated and downwardly extending tines that are spaced apart and positioned around the respective axis of rotation, a plural sided tool being fastened to each tine, said tool being planar and having cutting edges that surround said tine, said edges meeting at points, said soil working members being mounted in a row to work overlapping paths and the tools of



neighboring members being positioned at different levels to avoid fouling.

4,175,625

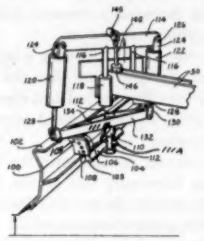
ARTICULATING GRADER HAVING STRUCTURE FOR RAISING AND LOWERING MOLD BOARD WITHOUT DISTURBING SETTING

Robert O. Puckett, 2814 Scenic Hwy., Snellville, Ga. 30278

Filed Jun. 23, 1977, Ser. No. 809,447

Int. Cl.[2] E02F *3/76*

U.S. Cl. 172—791 **12 Claims**

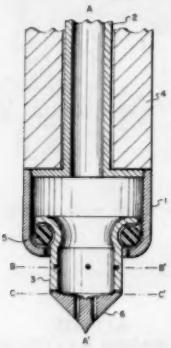


1. In a grader machine having a wheel supported machine frame, steering means for steering the machine, power means for driving the machine, a mold board supported and mounted for movement on and extending substantially transversely of said frame, and adjusting and support means for supporting and setting the transverse angle and relative vertical angle and height of said mold board to adjust the height of respective mold board ends with respect to the ground, the improvement comprising: said adjusting and support means comprising independent first and second generally vertically oriented power means extensible and retractable for adjusting and setting the relative vertical angle and height of said mold board, means for simultaneously raising and lowering both of said first and second extensible and retractable power means and said mold board therewith while maintaining the vertical and transverse angle setting thereof and without disturbing the setting of said first and second power means whereby said mold board may be set and thereafter raised and lowered above ground without disturbing the vertical and transverse angle setting and therefore without resetting said mold board each time it is raised, said raising and lowering means simultaneously raising and lowering said mold board and the said first and second extensible and retractable power means approximately straight up and down above the ground whereby the angular relationship of the mold board ends is not affected, said raising and lowering means comprising third generally vertically oriented power means.

4,175,626
FLUID-JET DRILL

Harold Tummel, 4630 Cole St., Dallas, Tex. 75205

Filed Sep. 15, 1978, Ser. No. 942,642
Int. Cl.[2] E21B 7/18
U.S. Cl. 175—422 4 Claims



1. A fluid-jet drill for subsurface drilling, comprising:
- a first cylindrical sleeve, having its forward edge curved inward;
- a second cylindrical sleeve, coaxial with the first cylindrical sleeve, having an outside diameter of lesser measure than the measure of the inside diameter of the first cylindrical sleeve, such that the forward end of the second cylindrical sleeve is flared to threadedly connect with the rearward end of the first cylindrical sleeve;
- a ring of circular cross-section, having a maximum outside diameter of measure slightly less than the measure of the inside diameter of the first cylindrical sleeve, such that it is retained forwardly by the forward curved edge of the first cylindrical sleeve;
- a third cylindrical sleeve, coaxial with the first cylindrical sleeve, extending forwardly out of the first cylindrical sleeve, having an outside diameter of lesser measure than the measure of the inside diameter of the first cylindrical sleeve, having its rearward edge curved outward, such that it extends through the center of said ring and such that its rearward edge retains rearwardly said ring;
- a solid cone, coaxial with the first cylindrical sleeve, having a maximum outside diameter of measure equal to the measure of the outside diameter of the the third cylindrical sleeve, such that it is permanently rearwardly affixed at the end of its maximum outside diameter to the forward end of the third cylindrical sleeve;
- a means for causing the rotation of the third cylindrical sleeve with respect to the first cylindrical sleeve about their common axis;
- a means for accelerating and expelling forwardly through said cone a pressurized fluid, such that this accelerated and expelled fluid might impinge upon the substance to be drilled.

4,175,627
PROPULSION SYSTEM FOR A SNOW GOING DEVICE

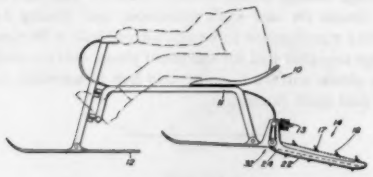
Royce H. Husted, Wheaton, Ill., assignor to Saroy Engineering, Wheaton, Ill.

Continuation-in-part of Ser. No. 790,655, Apr. 25, 1977, Pat. No. 4,095,849, which is a continuation-in-part of Ser. No. 599,003, Jul. 25, 1975, Pat. No. 4,035,035. This application Mar. 31, 1978, Ser. No. 892,085
Int. Cl.[2] B62M 27/00
U.S. Cl. 180—190 2 Claims

1. In a ski-bob type of a device, a propulsion system comprising in combination:

a tread having a chain carrying a plurality of cleats with resilient snow engaging portions,

an undersurface defining a longitudinal groove, said groove adapted to slidingly contain said chain and to provide a longitudinal bearing for it, supporting said cleats through said chain,

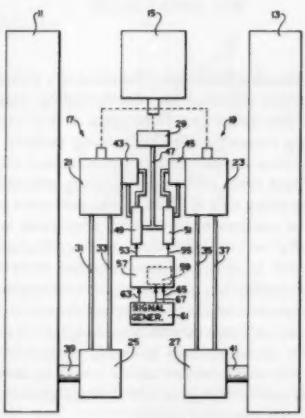


wherein said chain is made of links having side-plates and cross-members, and wherein said longitudinal bearing slidingly and directly supports said chain through said cross members.

4,175,628
STEERING CONTROL SYSTEM FOR DUAL PATH HYDROSTATIC VEHICLE

Charles R. Cornell, Battle Creek, Mich., and Dennis D. Simpson, Spencer, Iowa, assignors to Eaton Corporation, Cleveland, Ohio

Filed Jul. 10, 1978, Ser. No. 922,939
Int. Cl.[2] B62D 11/04; F15B 18/00; F16H 39/46; B60K 23/00
U.S. Cl. 180—6.48 8 Claims



1. A steering control system for a vehicle having first and second hydrostatic transmissions, each of said transmissions including a fluid pump unit and a fluid motor unit, one of said units being variable displacement, the vehicle further having a main control system including means for generating a command signal representative of the desired vehicle speed and vehicle direction, and first and second control means operable in response to changes in the command signal to vary the displacement of the variable displacement unit of the first and second transmissions, respectively, the steering control system comprising:
- (a) means for generating a steering signal representative of the commanded steering ratio and steering direction;
- (b) means for electrically sensing vehicle direction and commanded steering direction and generating an electrical switch signal having a first condition when it is necessary to modify the speed of the first transmission to achieve the desired orientation, and having a second condition when it

is necessary to modify the speed of the second transmission to achieve the desired vehicle orientation;

(c) means for electrically multiplying said steering signal and the command signal to generate a speed modification signal representative of the change in speed of one of the first and second transmissions necessary to achieve the commanded steering ratio; and

(d) electrical switching means operable to transmit said speed modification signal to the first control means in response to said switch signal being in said first condition and to transmit said speed modification signal to the second control means in response to said switch signal being in said second condition.

4,175,629

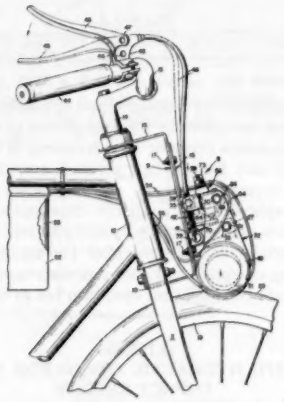
ELECTRIC DRIVE UNIT FOR VEHICLES

Albert A. Kalajzich, Brooklawn, N.J., assignor to General Engines Co., Inc., Thorofare, N.J.

Filed Mar. 23, 1978, Ser. No. 889,336

Int. Cl.[2] B62D *61/02, 61/08;* **B60K** *1/00, 17/14*

U.S. Cl. 180—220 **5 Claims**



1. An electric drive unit for a vehicle having a front fork, a handlebar connected to said front fork, a front wheel rotatively mounted in said fork, and a tire mounted on said wheel, said drive unit comprising support means secured to said fork, a motor supporting bracket, means connecting said motor supporting bracket to said support means for up and down movement, an electric motor carried by the motor supporting bracket and having a drive wheel disposed over said tire, a clamp secured to the handlebar, a lever pivotally connected to the clamp for swinging movement toward and away from a part of the handlebar, a cable having a lower end connected to a part of the support means and an upper end connected to said lever and slidably engaging said clamp, said motor supporting bracket having a part slidably engaging said cable above the connection of the cable to the support means, a flexible sheath in which a part of the cable is slidably encased, said sheath being formed of a material incapable of contracting, said sheath having one end abutting said clamp and an opposite end abutting said part of the motor supporting bracket which slidably engages the cable, whereby when the lever is swung toward the handlebar for exerting a pull on the cable end connected thereto said sheath will be distorted for exerting a downward thrust on said part of the motor supporting bracket engaged thereby, for displacing said bracket downwardly to move the drive wheel into engagement with said tire, a compression spring interposed between a part of the support means and a part of said motor supporting bracket for raising the motor supporting bracket to move the drive wheel out of engagement with the tire when pressure is released from said lever and for returning the cable and sheath to their normal positions, said means connecting the motor supporting bracket to the support means including upper and lower platform members extending outwardly from said support means, means pivotally connecting the platform members to the support means for up and down swinging movement, means carried by each platform member and swivelly engaging said motor supporting bracket and forming a connection between said bracket and the support means, said last mentioned means being spaced outwardly from said platform pivots, a current source carried by said vehicle, an electric circuit connecting said motor to said source, said circuit including a normally open electric switch supported by and movable with one of said platform members and a stationary switch actuator carried by the support means for engaging and closing the switch when the motor supporting bracket is displaced downwardly.

4,175,630

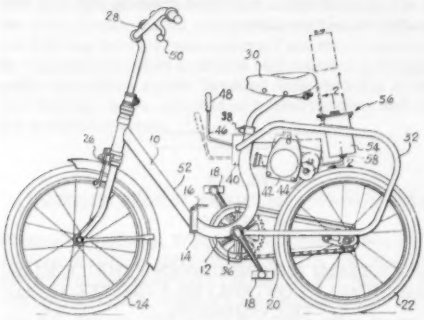
MOTORIZED BICYCLE WITH REMOVABLE FUEL TANK

Seymour Fleisher, 9 Kirkbride Ter., Towaco, N.J. 07082, and Warner Rosenschein, 19 Truman Blvd., Oakland, N.J. 07436

Filed Dec. 2, 1977, Ser. No. 857,017

Int. Cl.[2] B62D *27/06;* **F02B** *77/08*

U.S. Cl. 180—225 **12 Claims**



1. In combination with a motorized bicycle having a frame, a gasoline motor mounted on said frame, a drive spool rotated by said motor, and control means for selectively engaging said drive spool with a wheel of the bicycle, the improvement which comprises:

a gasoline tank which is selectively removable from said bicycle so as to render said bicycle, when removed therefrom, devoid of gasoline tanks for facilitating safe transport of same; and

housing means mounted on said frame for selectively retaining or releasing said gasoline tank and including a fuel line extending therefrom to said gasoline motor, and means for placing said fuel line in fluid communication with said gasoline tank only upon insertion of said tank into said housing means.

4,175,631

HEAT ABSORPTION MEANS OPERATIVE AT PRESCRIBED TEMPERATURE FOR SUPPRESSION OF HEAT TRANSFER FROM ABNORMALLY HEATED AUTOMOTIVE EXHAUST SYSTEM TO ARTICLE ON BOARD

Kiminori Ishii, and Katsuhiko Nishizawa, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 16, 1977, Ser. No. 851,956

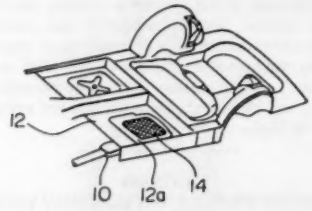
Claims priority, application Japan, Dec. 28, 1976, 51-159425

Int. Cl.[2] B60R *23/00;* **B60K** *13/04*

U.S. Cl. 180—309 **5 Claims**

1. In an automobile having a body including a floor and as a component of an exhaust system an exhaust gas purifying device, in which occurs exothermic oxidation of unburned

fuel, located beneath the floor, the improvement comprising a heat absorption layer which is particularly operative at a prescribed temeperature within the range from about 100° C. to about 1200° C. and located within a space bounded on its upper and lower sides by a horizontal plane slightly above the upper surface of the floor and the outer and upper surface of the



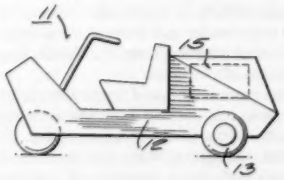
purifying device, respectively, a principal material of said heat absorption layer being a substance which absorbs a large amount of heat at a temperature which is specific to said substance and agrees with said prescribed temperature, said heat absorption layer consisting of a container made of a heat-conductive and uncombustible metal foil material and said substance packed in said container.

4,175,632

DIRECT CURRENT MOTOR DRIVEN VEHICLE WITH HYDRAULICALLY CONTROLLED VARIABLE SPEED TRANSMISSION

George G. Lassanske, 1303 Riverdale Dr., Oconomowoc, Wis. 53066

Filed Apr. 22, 1977, Ser. No. 789,797
Int. Cl.[2] B60K *25/10*
U.S. Cl. 180—65 R 9 Claims



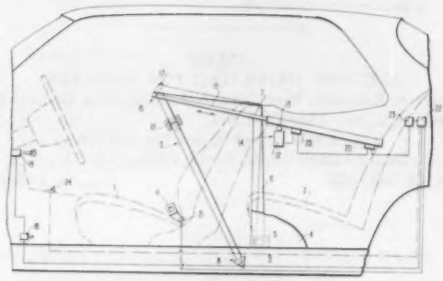
1. A vehicle comprising a frame, a drive wheel supported by said frame, a direct current motor supported by said frame, a drive train connecting said direct current motor and said drive wheel and including a variable speed "V" belt drive with a rotatably carried pulley including a non-axially movable sheave and an axially movable sheave, and means biasing said axially movable sheave away from said non-axially movable sheave, a hydraulic circuit for regulating the axial position of said axially movable sheave and including a pump driven by said motor, hydraulic cylinder piston means in communication with said pump and mechanically connected to said axially movable sheave for applying a force urging said axially movable sheave toward said non-axially movable sheave, and control means for regulating the pressure of the fluid in said hydraulic cylinder piston means to regulate the axial force applied to said axially movable sheave.

4,175,633

INSTALLATION FOR FEEDING THE LOCK TONGUE AND/OR THE BELT BAND OF A BELT SYSTEM

Rudolf Andres, Sindelfingen, and Eduard Ament, Gechingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 21, 1978, Ser. No. 888,745
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1977, 2713172
Int. Cl.[2] B60R *21/02*
U.S. Cl. 180—270 22 Claims



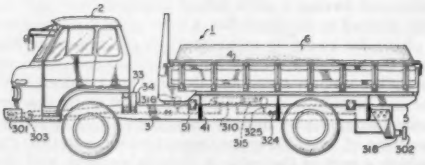
1. An installation for feeding a part of a safety belt system into a position favorable for the engagement of the belt, comprising servo-means operable after boarding of the vehicle to transfer said part from a rear position essentially allowing unimpaired access to the rear seat into a forward position accessible to the drive or co-driver, characterized in that the servo-means is operable to return said part into the rear position substantially immediately after the termination of the belt-engaging operation and after a predetermined time interval should said belt-engaging operation fail to be performed.

4,175,634

TRUCK WITH HYDRAULIC MEANS FOR ABSORBING IMPACT ENERGY

Akira Yamanaka, Yokohama, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 678,136, Apr. 19, 1976, Division of Ser. No. 506,796, Sep. 17, 1974, Pat. No. 3,993,352. This application Feb. 21, 1978, Ser. No. 879,453
Int. Cl.[2] B62D *27/06*
U.S. Cl. 180—274 7 Claims



1. A truck, comprising:
a truck frame structure,
a cab for the driver mounted on said frame structure,
a load carrier structure mounted on said frame structure for frictional sliding movement longitudinally of said frame structure when a longitudinal impact exceeding a predetermined value is imposed on said frame structure,
a first hydraulic unit connected between said frame structure and said carrier structure and comprising a cylinder extending longitudinally of said structure and a piston slidable in said cylinder and fixed to the other of said structures,
a first bumper at the front of said frame structure and means

mounting said front bumper comprising a second hydraulic unit comprising a cylinder fixed to said frame structure and a piston slidable in said cylinder and fixed to said front bumper,

a rear bumper at the rear of said frame structure and means mounting said rear bumper comprising a third hydraulic unit comprising a cylinder fixed to said frame structure and a piston slidable in said cylinder and fixed to said rear bumper,

conduit means connecting the cylinder of said second hydraulic unit with the cylinder of said first hydraulic unit to transmit fluid pressure from said second hydraulic unit to said first hydraulic unit in a direction to move said carrier structure rearwardly of said frame structure in the event of an impact on said front bumper, and

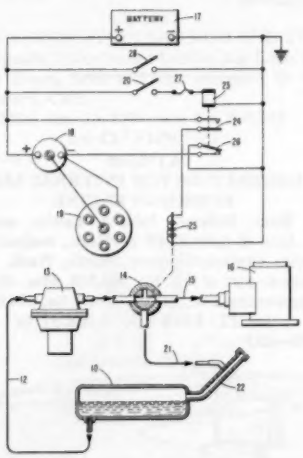
conduit means connecting the cylinder of said third hydraulic unit with the cylinder of said first hydraulic unit to transmit fluid pressure from said third hydraulic unit in a direction to move said carrier structure forwardly of said frame structure in the event of an impact on said rear bumper.

4,175,635

ANTI-THEFT DEVICE FOR INTERNAL COMBUSTION ENGINE OF A MOTOR VEHICLE

James Thomas, R.D. 5, Box 31A, Dover, Del. 19901

Filed Jul. 6, 1978, Ser. No. 922,486
Int. Cl.[2] B60R *25/04*
U.S. Cl. 180—287 **1 Claim**



1. An anti-theft device for an internal combustion engine of a motor vehicle comprising, in combination,

a fuel tank,

a fuel pump,

a carburetor,

a three-way solenoid valve,

an ignition circuit including an ignition coil and a distributor, and

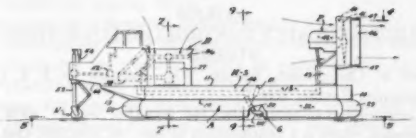
a return fuel line located between said fuel tank and said three-way solenoid valve, said three-way solenoid valve being connected between said fuel pump and said carburetor and activated by a switch known to the operator and independent of the normal ignition system in said motor vehicle, said three-way solenoid valve upon activation causing stoppage of the flow of gasoline from said fuel pump to said carburetor and at the same time causing diversion of gasoline back to said gas tank, activation of said switch also breaking the circuit between said ignition coil and said distributor.

4,175,636

HEAVY LIFT AIR CUSHION AMPHIBIOUS VEHICLE

Jacksel M. Broughton, 4096 Bonita View Dr., Bonita, Calif. 92002

Filed Jan. 27, 1978, Ser. No. 873,015
Int. Cl.[2] B60V *1/00*
U.S. Cl. 180—119 **26 Claims**



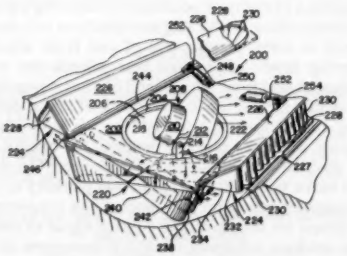
1. An air cushion vehicle operable over land, water and ice separately and in combination, and including; an elongated hull of rectangular configuration having a flat bottom extending from side to side and from bow to stern, a perimeter skirt coextensive of the hull sides bow and stern and comprised of air inflated cylinders in continuous abutted end to end engagement attached tangentially to marginal edges of the hull bottom, inboard curtains extending diagonally outward from the hull bottom and tangentially to the skirt cylinders to restrain the same, ducted fan lift means discharging vertically through the hull and from the bottom thereof and into a plenum defined by the perimeter skirt cylinders and restraining curtains, propeller propulsion means thrusting longitudinally of the hull, and steering means operable to laterally deflect the thrust of the propulsion means.

4,175,637

SURFACE EFFECT VEHICLES AND GUIDEWAYS THEREFOR

William R. Bertelsen, 2720 31st Ave., Rock Island, Ill. 61201

Division of Ser. No. 321,948, Jan. 8, 1973, Pat. No. 3,845,716, which is a continuation-in-part of Ser. No. 871,765, Jul. 31, 1970, Pat. No. 3,712,406, which is a continuation-in-part of Ser. No. 633,357, Apr. 21, 1967, which is a continuation-in-part of Ser. No. 731,001, Apr. 25, 1958, abandoned. This application Nov. 4, 1974, Ser. No. 520,795
Int. Cl.[2] B60V *1/16*
U.S. Cl. 180—128 **6 Claims**



1. An improved air cushion vehicle comprising, in combination, means including an upper deck and a skirt depending from the peripheral edge of said deck and arranged so as to define the periphery of a primary air support plenum beneath said deck for supporting said vehicle above a surface, and means forming at least one secondary plenum lying laterally of said primary plenum, said secondary plenum being at least partially defined by a secondary plenum skirt depending from rigid means hingedly mounted with respect to said upper deck, means for supplying a volume of air under pressure to said primary plenum, with bleed air openings being provided in said skirt defining said primary plenum, so as to permit said air under pressure to flow from said primary plenum into said

secondary plenum, said primary plenum being of a size relative to said secondary plenum so that said vehicle may be supported above said surface entirely by said primary plenum alone, with said secondary plenum being swingable outwardly and upwardly to a position for cooperation with a supporting surface when said supporting surface is in the form of a track having an upwardly and outwardly curved surface portion.

4,175,638

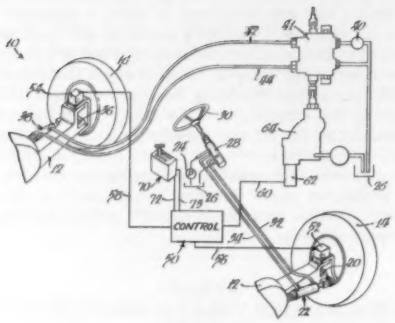
ELECTRONICALLY CONTROLLED FOUR-WHEEL STEERING

Robert F. Christensen, Racine, Wis., assignor to J. I. Case Company, Racine, Wis.

Continuation-in-part of Ser. No. 941,186, Sep. 11, 1978, abandoned, which is a continuation of Ser. No. 844,509, Oct. 21, 1977, abandoned. This application Dec. 4, 1978, Ser. No. 965,855

Int. Cl.[2] B62D *5/08*

U.S. Cl. 180—140 **19 Claims**



17. A steering system for a vehicle including front and rear pairs of wheels with first means for simultaneously controlling the turning movement of said front wheels, second means for simultaneously controlling the turning movement of said rear wheels, first sensing means producing a first signal which is a function of the angular position of said front wheels, second sensing means producing a signal which is a function of the angular position of said rear wheels, control means receiving said signals, said control means including switch means movable to define a plurality of positions for selecting a plurality of modes of controlling the turning movement of said rear wheels in response to turning movement of said front wheels and a rear steering mode where said rear wheels are controlled independent of said front wheels, and control means for actuating said switch means, the improvement of said control means including a fixed support with said switch means secured to said support, a selector member mounted for rotation between extreme positions on said support and connected to said switch means to move said switch means to said plurality of positions, signal producing means on said support and connected to said control means for introducing a control signal to said control means to produce independent turning movement of said rear wheels, said signal producing means including a switch actuator for varying said control signal to turn said rear wheels independently of said front wheels, and safety limiting means normally preventing said selector member from being rotated from one extreme position to the other extreme position.

4,175,639

NOISE BARRIER

Leslie S. Wirt, Newhall, Calif., assignor to Lockheed Corporation, Burbank, Calif.

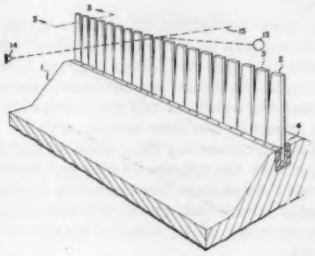
Filed Nov. 16, 1976, Ser. No. 742,404

Int. Cl.[2] G10K *11/00*; B64F *1/26*; E10F *15/00*

U.S. Cl. 181—210 **7 Claims**

1. An acoustical barrier for interposition between a noise source and a noise receiver located within the acoustical shadow zone of the barrier, comprising:

a barrier member having an acoustically opaque base portion and having contiguous therewith an upwardly extending transition portion comprising a plurality of identical spaced apart elements each of which has an effective surface area which continuously decreases in said upwardly extending direction whereby the sound transmissibility between said elements follows a gradient and the sound transmitted between said elements tends to apply a phase opposition to the sound arriving at the noise receiver by diffraction around the acoustical barrier through a region outside said shadow zone and thereby effectively redirect such diffracted sound away from said noise receiver.



4,175,640

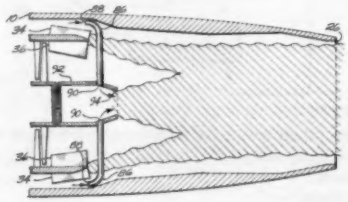
VORTEX GENERATORS FOR INTERNAL MIXING IN A TURBOFAN ENGINE

Stanley F. Birch, Bellevue; John A. Lawler, and Gerald C. Paynter, both of Seattle, all of Wash., assignors to Boeing Commercial Airplane Company, Seattle, Wash.

Continuation-in-part of Ser. No. 563,548, Mar. 31, 1975. This application Dec. 23, 1976, Ser. No. 754,046

Int. Cl.[2] E04B *1/99*; G10K *11/04*

U.S. Cl. 181—213 **14 Claims**



1. In a turbofan engine having an annular fan fluid flow exhaust passageway located between an outer engine cowling and a splitter wall structure, and an annular primary fluid flow exhaust passageway located inside of said splitter wall structure, apparatus for internal mixing of fan exhaust with primary exhaust forward of the nozzle exit plane of said engine comprising:

a vortex generator attached to said splitter wall structure at least one nozzle diameter forward of said nozzle exit plane and extending radially into one of said annular passageways a distance of at least 30% of the width of the passageway, and mounted to have an angle of attack with respect to the local flow direction ranging from 5° to 25°.

4,175,641

STEP LADDER LEG SUPPORT

George Q. Reyes, 154 Farrell Dr., San Antonio, Tex. 78227

Filed Jan. 20, 1978, Ser. No. 871,033
Int. Cl.[2] E06C 1/22
U.S. Cl. 182—172 2 Claims

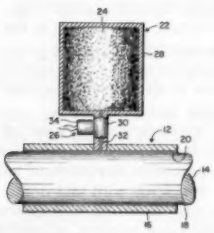
1. In a stepladder support load equalizing means, pivotal members extending laterally therefrom, means for vertically adjusting the pivotal members individually to maintain the stepladder secure, pivotal feet horizontally mounted on the extended end of said members, collars mounted on the upper portion of the stepladder and the pivotal members extending from said collars and an equalizing bar mounted on the upper portion of said stepladder and extending through said collar.

4,175,642

PASSIVE LUBRICATION METHOD AND SYSTEM

Maurice P. Bianchi, Palos Verdes Estates, and Louis A. Rosales, Manhattan Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Jan. 13, 1978, Ser. No. 869,341
Int. Cl.[2] F16N 7/12
U.S. Cl. 184—1 E 15 Claims



14. The method of lubricating surfaces, comprising the steps of:

containing lubricating oil with an oil receptacle comprising a porous oleophobic body containing a myriad of capillary pores impregnated with said oil, and

communicating said receptacle to said surfaces to effect transfer of oil from said receptacle to said surfaces by capillary expulsion of oil from the pores in said body to said surfaces.

4,175,643

LUBRICATING SYSTEM FOR POWER TRANSMITTING APPARATUS

David K. Jenkins, Lathrup Village, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

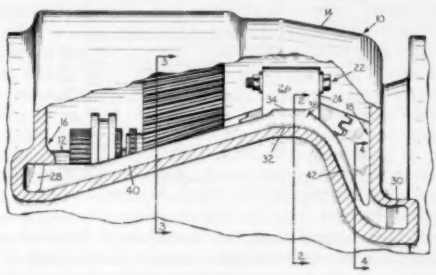
Filed Dec. 11, 1975, Ser. No. 639,931
Int. Cl.[2] F16N 7/36
U.S. Cl. 184—11 A 1 Claim

1. A lubricating system for a forward bearing and a rear bearing of a shaft in an interaxle differential assembly, said interaxle differential assembly being of the type which includes a housing having a liquid lubricant sump therein and a number of elements thereof capable of rotating within said housing to splash said liquid lubricant about the interior of said housing, said lubricating system comprising:

a first supply port and a second supply port through said housing respectively aligned with said forward bearing and said rear bearing capable of supplying liquid lubricant thereto by gravity flow;

an interaxle differential housing having a casing and being mounted on said shaft between said bearings for rotation therewith, said casing having an outer surface thereon coaxially aligned with said shaft;

means for removing said liquid lubricant from said outer surface during rotation of said shaft, said means for removing said liquid lubricant from said outer surface being an oil scraping device which is formed integrally with said housing and extends rigidly from an interior surface thereof toward said outer surface in close proximity thereto;



a first open channel extending forwardly and downwardly of said oil scraping device to said first supply port for gravity transfer of said liquid lubricant thereto;

a second open channel extending rearwardly and downwardly of said oil scraping device to said second supply port for gravity transfer of said liquid lubricant thereto; and

said first channel and said second channel being formed integrally with said housing and extending rigidly from said interior surface thereof.

4,175,644

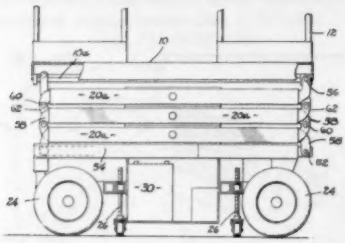
SCISSORS LIFT

Bert J. Sikli, Venice, Calif., assignor to Robert Staines, Paramount, Calif.

Continuation-in-part of Ser. No. 542,508, Jan. 20, 1975, Pat. No. 3,983,960, which is a continuation-in-part of Ser. No. 406,260, Oct. 15, 1973, abandoned. This application Jul. 7, 1975, Ser. No. 593,637
The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.
Int. Cl.[2] B66B 11/04; E04G 1/22
U.S. Cl. 187—18 19 Claims

7. A load lifting scissors lift assembly comprising a lower frame, an upper platform, a lower tier and a next adjacent upper tier of vertically-extensible parallel scissors-type linkages interposed between said lower frame and said upper platform, each of the linkages in said tiers being comprised of a first lever arm and a second lever arm which form the linkages of each tier, and each of said arms having longitudinal centerlines passing through the longitudinal axis of each of said arms and being equidistant between upper and lower surfaces on each of said arms, coupling means for pivotally coupling the end of a first arm of a lower tier to the associated end of a second arm of the next upper tier, said coupling means comprising an upwardly located first ear-shaped bracket member mounted at

the end of the first arm of the lower tier, said coupling means also comprising a downwardly located second ear-shaped bracket member mounted at the end of the second arm of the next upper tier, said first bracket member having an aperture located above the upper surface of said first arm to which said bracket is mounted, said second bracket member having an aperture alignable with the aperture in said first bracket and being located below the lower surface of said second arm to which said bracket is mounted such that the apertures are substantially equidistantly spaced from the centerlines of the arms in the brackets mounted to said arms, a pivot pin located in said aligned apertures and being located above the lower surface of said last-named second arm and above the upper surface of said last-named first arm and being substantially



equidistantly spaced from the centerlines of the two arms which are so pivotally coupled to displace the pivot axis of the adjacent pairs of arms away from the longitudinal axis of the respective arms to permit the linkages to be collapsed to a position in which the arms of each pair lie in juxtaposed relationship to the arms of the next lowermost pair, an essentially vertically positioned extensible drive unit, at least one first transverse cross-bar connected to the first arms of each of said tiers of said linkages, at least one second transverse cross-bar connected to second arms of each of said tiers of said linkages, first connection means pivotally connecting a first cross-bar of one of said tiers to said drive unit, and second connection means pivotally connecting a second cross-bar of another of said tiers to said drive unit.

4,175,645

ELECTRICALLY RESETTABLE RAILWAY BRAKE

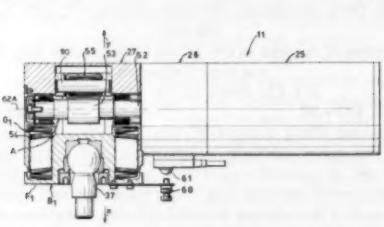
Franz Brinkert, Duisburg, Fed. Rep. of Germany, assignor to Raco-Elektro-Maschinen GmbH, Schwelm, Fed. Rep. of Germany

Filed Mar. 7, 1978, Ser. No. 884,158

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1977, 2710585

Int. Cl.[2] F16D *65/22*

U.S. Cl. 188—72.1 **24 Claims**



1. A brake comprising:

a drive motor having a rotary motor output;

a free-running transmission having a rotary transmission input connected to said motor output and a rotary transmission output, said transmission operating at a relatively high transmission ratio such that said transmission input rotates at a speed many times greater than said transmission output;

an eccentric mounted on said transmission output for rotation therewith about the axis thereof;

a follower operatively radially engageable with said eccentric and radially displaceable thereby in a predetermined radial direction on rotation of said eccentric about said axis;

an abutment spaced a fixed distance in said direction from said axis;

at least one spring operatively engaged between said abutment and said follower and compressible thereby;

a braking member displaceable transverse to said direction adjacent said follower; and

a braking body connected to said follower and engageable in said direction with said member on radial displacement of said follower in said direction away from said axis.

4,175,646

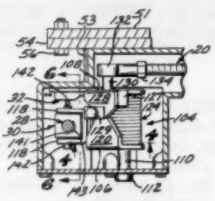
ELECTRIC PARKING BRAKE

Bruce H. Eikelberger, 2396 California Ave., Long Beach, Calif. 90806

Filed May 3, 1978, Ser. No. 902,348

Int. Cl.[2] F16D *65/36*

U.S. Cl. 188—156 **7 Claims**



3. A parking brake for a vehicle employing an electrical power producing system and a hydraulic brake system including a hydraulic brake cylinder comprising:

a housing immobilized with respect to the vehicle frame and coupled to a said brake cylinder,

a ram positioned for reciprocal movement relative to said brake cylinder to alternatively increase and decrease hydraulic pressure in said cylinder,

an electric motor electrically connected to said electrical power producing system and mechanically linked to drive said ram in alternative directions of movement,

limit switches associated with said motor to break the electrical connection therefrom to said electrical power producing system upon rotation of said motor to limits in opposite directions of rotation,

an actuating switch for initially completing connection of said electric motor to said electrical power producing system to initiate actuation of said electric motor for rotation in a selected direction, and

a spring loaded accumulator interposed between said electric motor and said ram to compensate for variations in hydraulic volume within said parking brake cylinder.

4,175,647

HYDRODYNAMIC RETARDER FOR VEHICLES, ESPECIALLY FOR MOTOR VEHICLES

Hans Hanke, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 13, 1978, Ser. No. 886,120

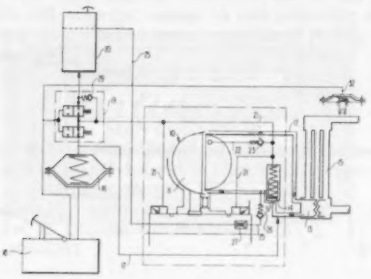
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1977, 2710927

Int. Cl.[2] F16D *57/04, 65/78*

U.S. Cl. 188—274 **14 Claims**

1. A hydrodynamic retarder for vehicles, the retarder com-

prising at least one rotating and at least one stationary blade wheel disposed in a working space means of the retarder, an internal working circulatory system for supplying working fluid to the working space means, an external cooling circulatory system operatively connected to the internal working circulatory system, line means for filling and discharging the cooling circulatory system to and from a filling means, a control valve means for interrupting a flow of the external cooling circulatory system, lubricating line means for operatively connecting sealing spaces at a shaft of the retarder a center of the working space means and also with a control member of the control valve means, and with a fluid reservoir tank, a closure



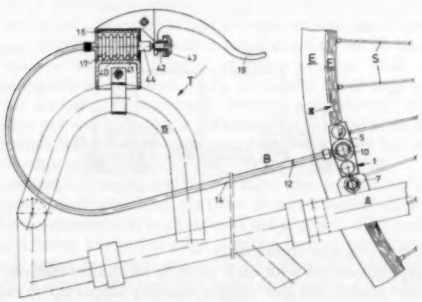
valve means for operatively connecting the reservoir tank with the filling and discharge line means, characterized in that a first check valve means opening in a direction toward the working space means is arranged in a connection portion of the lubricating line means to the center of the working space means, a further line means independent of the lubricating line means for connecting an inlet of the retarder with the reservoir tank, a second check valve means is arranged in the further line means for venting the retarder to the reservoir tank, said second check valve means opening in a direction toward the retarder inlet, and in that a throttle means is arranged in the further line means upstream of the second check valve means for controlling a flow through the second check valve means.

4,175,648

DEVICE FOR THE BRAKING OF BICYCLES

Sandor Sule, Steigstrasse 77, CH 8200 Schaffhausen, Switzerland

Filed Oct. 20, 1977, Ser. No. 844,042
Int. Cl.[2] B62L *1/10, 3/02*
U.S. Cl. 188—344 **2 Claims**



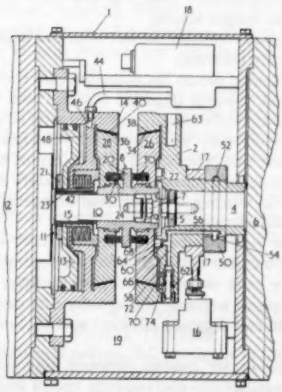
1. Bicycle braking apparatus comprising: a first brake shoe positioned adjacent a wheel of the bicycle and displaceable between an inoperative position spaced from the wheel and an operative position in which the first brake shoe contacts the wheel and applies braking force thereto; movable brake handle means mounted on a portion of the bicycle; operation means connecting said brake handle means and said first brake shoe for displacing the first brake shoe to said operative position when the brake handle means is displaced; restoring means for returning said first brake shoe to said inoperative position when the brake handle means is released; said operation means comprising a first hydraulically actuatable pressure member operatively coupled to said first brake shoe for displacing the first brake shoe to said operative position, a hydraulic cylinder operatively coupled to said brake handle means for being actuated thereby, and hydraulic circuit means connecting said hydraulic cylinder and said first hydraulically actuatable pressure member for pressurizing said first hydraulically actuatable pressure member when the hydraulic cylinder is actuated by the brake handle means, each of said first pressure member and hydraulic cylinder comprising a bellows member having variable volume thereof, the bellows members of said first pressure member and said hydraulic cylinders having interior volumes connected by said hydraulic circuit means and being filled with hydraulic brake fluid, each said bellows member comprising a plurality of interconnected annular elements displaceable with respect to one another and constituting a liquid-tight wall, an inner sealing lining within said wall forming said interior volume and a restoring spring coaxially arranged within said inner sealing lining, said handle means comprising a handle portion pivotable between an operative position and an inoperative position, an adjustable shaft operatively connected to said handle portion and movable thereby into an engaging position, said hydraulic cylinder including an axial pin extending therefrom in axial alignment with said adjustable shaft for undergoing axial displacement when said handle portion moves from the inoperative to the operative position for compressing said bellows member of the hydraulic cylinder and concurrent expansion of the bellows member of the first pressure member, said spring within each said bellows member opposing deformation thereof and returning the respective bellows member to initial state with the handle released and returned to inoperative position.

4,175,649

CONVEYOR DRIVES

Harry Monks, Burton-on-Trent, England, assignor to Coal Industry (Patents) Limited, London, England

Continuation of Ser. No. 350,785, Apr. 13, 1973, abandoned.
This application Mar. 24, 1975, Ser. No. 561,291
Int. Cl.[2] F16D *67/04*
U.S. Cl. 192—18 A **12 Claims**



1. A drive mechanism for a conveyor, comprising:
(a) a driving stage;
(b) a motor for driving said driving stage;
(c) a driven stage to drive the conveyor;
(d) a clutch for drivably engaging said driving stage to said

driven stage, said clutch being biased to disengage said driving and driven stages;

(e) a brake biased to contact said driven stage to brake the conveyor; and

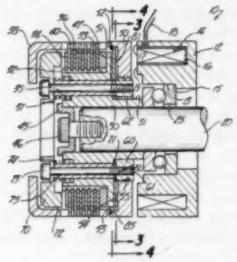
(f) means to prevent said motor from starting under load of the conveyor, including a pump connected to and driven by said driving stage for pumping fluid under pressure, and control means connected to said pump to deliver the fluid to said brake and said clutch to control said brake and said clutch, said control means including means to enable the fluid pressure to increase to release said brake from said driven stage before said clutch engages said driving stage with said driven stage after said motor has started and is running at substantially full speed.

4,175,650

SELF-ADJUSTING ELECTROMAGNETIC DISC CLUTCH

Donald L. Miller, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed Mar. 11, 1977, Ser. No. 776,676
Int. Cl.[2] F16D *13/75, 27/10*
U.S. Cl. 192—84 C **7 Claims**



1. An electromagnetic friction device for transmitting torque comprising:

input means;

output means coaxially disposed with said input means;

means for driving said output means, said driving means translating torque from said input means to said output means, said driving means further comprising:

an inner body member coaxially disposed with said input means for rotating therewith;

means for frictionally engaging said inner body member with said output means;

bearing means mounted coaxial with and adjacent to said inner body member;

electromagnetic means for actuating said friction device;

an armature member disposed adjacent said electromagnetic means and coaxially mounted with said inner body member whereby when said electromagnetic means is energized a circuitous flux path is formed between said electromagnetic means and said armature member;

first means for biasing said frictional engaging means, said biasing means comprising:

an annular ring member disposed coaxially with said armature member and said inner body member;

a pressure plate member, said plate member having one end disposed adjacent said annular ring member and an opposite end disposed adjacent said frictional engaging means;

second means for biasing disposed between said inner body member and said opposite end of said plate member;

an annular retarder member coaxially disposed with said armature member, said retarder member further communicating with said one end of said plate member for axial but nonrotatable movement with respect to said pressure plate member;

means for mounting said annular ring member to said one end of said pressure plate member; and

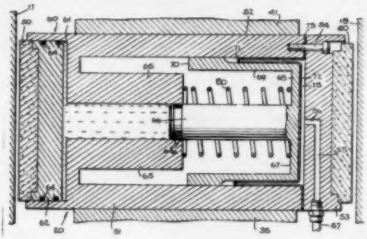
means for engaging said opposite end of said pressure plate member with said frictional means.

4,175,651

AIR/MERCURY ACTUATION OF BRAKES AND CLUTCHES

Edwin J. Montalvo, Sr., 1375 Forest Ave., Portland, Me. 04103

Filed Mar. 28, 1977, Ser. No. 782,234
Int. Cl.[2] F16D *25/04*
U.S. Cl. 192—85 AB **20 Claims**



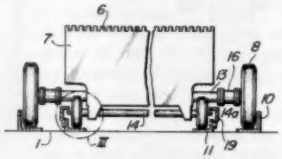
1. A mechanism for selectively frictionally coupling two relatively rotatable bodies comprising two parallel friction plates connected to a first one of said bodies transverse to the axis of rotation of said first body, the second of said bodies carrying an expandible piston and cylinder means mounted between said friction plates for engagement of friction members carried by said piston and cylinder means with said friction plates upon expansion of said piston and cylinder means, said piston and cylinder means being mounted to float in a cylinder carrying member on said second body for applying equal force against both said friction plates upon expansion of said piston and cylinder means, said piston and cylinder means having a seepage resistant hydraulic medium within a cylinder chamber.

4,175,652

ESCALATOR WITH STEP LEVELERS

Yoshihiko Satou, and Katsuya Teranishi, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 23, 1976, Ser. No. 753,886
Claims priority, application Japan, Dec. 29, 1975, 50-155987
Int. Cl.[2] B66B *9/12*
U.S. Cl. 198—/332 **9 Claims**



1. An escalator comprising:

steps connected with each other in an endless fashion;

front wheels and rear wheels rotatably supported by each of said steps through a front shaft and a rear shaft, respectively;

a first pair of guide rails on which said front wheels roll, and a second pair of guide rails on which said rear wheels roll;

projections extending coaxially outwardly from the ends of said rear shaft; and

a pair of upthrust rails disposed in a juxtaposed relation to said projections and adapted to engage with said projec-

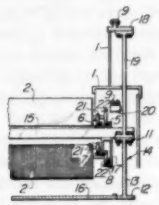
tions, upon the upward pivotal movement of the step, to prevent the further upward pivotal movement of the step, wherein each of said second pair of guide rails includes a horizontal section defining a rolling surface for said rear wheel, and a vertical section on the edge of said horizontal section at the side where said projection is located, and wherein each of said pair of upthrust rails includes a horizontal section disposed above said projection, and wherein a clearance between the tip of the projection and the vertical section of said upthrust rail and a clearance between the rear wheel and the edge of the horizontal section of said upthrust rail are greater than that between the rear wheel and the vertical section of said second guide rail, whereby damage to said projection and upthrust rail can be prevented upon lateral shifting of said steps.

4,175,653

MAN CONVEYOR

Masayuki Kubota, Nakaminato, and Masamitu Hanano, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 25, 1977, Ser. No. 844,990
Claims priority, application Japan, Oct. 29, 1976, 51-129467
Int. Cl.[2] B66B 9/14
U.S. Cl. 198—332 **6 Claims**



1. A man conveyor comprising:

a plurality of steps linked in an endless belt and each having front and rear wheels mounted on both lateral sides thereof;

a plurality of balustrades located on both sides of said plurality of steps in an adjacent relationship thereto;

a pair of guide members each mounted on one of said pair of balustrades, each said guide members having an upper end of said balustrade connected to the underside thereof in a position above and laterally near said plurality of steps;

a pair of endless handrails each guided by one of said pair of guide members for movement in the same direction and the same speed as said plurality of steps;

a pair of main frame members each in the form of an I-beam located on either side of said plurality of steps, each of said pair of main frame members being disposed below one of said pair of balustrades as an entity separate from said balustrade and consisting of a horizontal upper edge portion including a horizontal surface, a horizontal lower edge portion including a horizontal surface and a vertical portion interposed between said upper and lower horizontal edge portions and formed integrally therewith;

upper and lower connecting members interconnecting said upper horizontal edge portions of said plurality of main frame members on both sides of the plurality of steps and said lower horizontal edge portions thereof respectively, said upper and lower connecting members and said plurality of main frame members being arranged in a manner to form a box-shaped cross section;

a plurality of guide rails mounted on upper and lower surfaces of said upper connecting members for guiding said front and rear wheels of said plurality of steps during the travel of said steps between a passenger boarding area and a passenger alighting area of the main conveyor in both normal and reverse directions; and

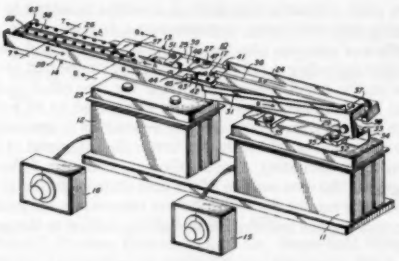
a plurality of struts each rigidly secured at an upper end thereof to the underside of one of said pair of guide members in a position laterally spaced from the position in which one of said pair of balustrades is connected to said guide member and secured at a lower end thereof to the horizontal upper edge portion of each said main frame members upon said horizontal surface.

4,175,654

VIBRATORY FEEDER SYSTEM AND MECHANISM

Maurice H. Lodge, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 21, 1977, Ser. No. 844,342
Int. Cl.[2] B65G 47/24
U.S. Cl. 198—398 **6 Claims**



1. A vibratory feeder system for orienting and feeding devices which have two parallel sides out of one side of which there projects one centrally disposed terminal and out of the other side of which there project two symmetrically disposed terminals, the ends of each of said terminals extending away from the adjacent major surface of said device comprising,

a vibratory feeder track for advancing oriented devices thereon,

inventory means connected to said feeder track,

groove means on said track in line with said feed direction for being engaged by said terminals,

said feeder track having an angularly downwardly disposed feeder surface for gravity assist in device orientation and rejection of upside down and other misoriented devices,

lead-in means disposed on said angular surface and having an angular edge sloping downwardly in the direction of device travel for enabling the preponderance of devices which are engaged by said groove, to be engaged by said one terminal, rejecting means having an edge disposed adjacent said groove for rejecting devices whose terminals are in said groove and the devices are upwardly disposed,

slot means beyond said rejecting means and whose lower edge is adjacent said groove for receiving and recycling devices not rejected by said rejecting means,

lead-out means terminating said groove for disposing devices on said angle surface,

first rail means having a ledge for retaining devices on said angle surface following said lead out means, and

second rail means disposed away from the ledge of said first rail means to form a path for receiving oriented devices.

4,175,655

PANEL TURNER

Arthur M. Baldwin, Cordova, S.C., assignor to Champion International Corporation, Stamford, Conn.

Filed Mar. 29, 1978, Ser. No. 891,066
Int. Cl.[2] B65G 47/24
U.S. Cl. 198—403 **12 Claims**

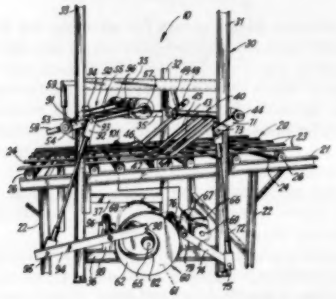
1. An apparatus for inverting a panel member comprising: a conveyor for transporting the panel in a horizontal direction, said conveyor including a plurality of spaced apart substantially parallel endless belts;

a frame member including first and second pairs of opposed uprights disposed above the conveyor and enclosing said conveyor;

a panel raising mechanism for engaging the leading edge of the panel as the panel moves along the conveyor, said panel raising mechanism including a transverse bar rotatably mounted above the conveyor on the second pair of opposed frame uprights, a plurality of spaced apart extension members rigidly connected to said transverse bar, and roller means rotatably connected to the free end of each of said extension members, said roller means being spaced apart from each other such that each of said roller means can fit in the space between the adjacent conveyor belts;

means separate from the panel for pivoting said panel raising rollers about their respective transverse bar above and below the conveyor comprising:

a cam plate rotatably mounted on a shaft connected to the frame, said shaft being connected to a driving motor, one surface of said cam plate having a cam surface, said means further including a link member rigidly connected at one end to the panel raising transverse bar, the other end of said link member being pivotally connected to an extension lever, a cam lever pivotally connected at one end to the other end of said extension lever, the other end of said cam lever including a cam follower, said cam follower engaging the cam surface of the cam plate such that as the cam plate rotates the cam follower transverses the path of the cam surface and imparts a pivoting motion to the panel



raising mechanism through the cam lever, the extension lever, and the link member connected thereto;

a panel lowering mechanism for engaging the leading edge of the panel after the panel has been raised past the vertical, said panel lowering mechanism including a transverse bar rotatably mounted above the conveyor on the first pair of opposed frame uprights, a plurality of spaced apart extension members rigidly connected to said transverse bar, and roller means rotatably connected to the free end of each extension member, said roller means being spaced apart from each other such that each can fit in the space between adjacent conveyor belts, said panel lowering mechanism being disposed opposite said panel raising mechanism such that the extension members of said mechanisms extend towards each other;

means separate from the panel for pivoting said panel lowering rollers about their respective transverse bar above and below the conveyor;

means responsive to the presence of the panel for actuating said apparatus; and

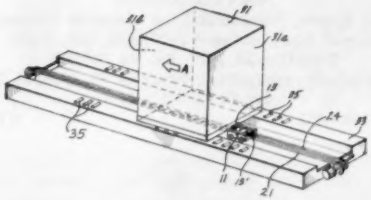
a means separate from said panel for coordinating said panel raising and lowering mechanisms such that when the leading edge of the panel first engages the panel raising mechanism the rollers of said panel raising mechanism are disposed below the conveyor and the rollers of the panel lowering mechanism are disposed above the conveyor, and such that when the panel raising mechanism has raised the panel to a vertical position the rollers of both the panel raising and panel lowering mechanisms are disposed above the conveyor, and such that when the panel lowering mechanism deposits the leading edge of the panel back onto the conveyor the rollers of said panel lowering mechanism are disposed below the conveyor while the panel raising rollers are disposed above the conveyor.

4,175,656

TRACK MOUNTED CARGO SHUTTLE

John M. Lang, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 27, 1977, Ser. No. 864,734
Int. Cl.[2] B65G *25/04*
U.S. Cl. 198—748 **9 Claims**



1. An apparatus for transporting cargo over a load-bearing surface comprising:

track means extending along the path of travel of the cargo;

a shuttle carriage including a frame, said carriage being supported by and positioned for movement along said track means;

first and second cargo engaging pawls;

first and second rocker arms, each of said rocker arms having first and second ends;

first means for mounting said first pawl on said first end of said first rocker arm for rotation of said first pawl between an erect position and a reclined position;

second means for mounting said second pawl on said first end of said second rocker arm for rotation of said second pawl between an erect position and a reclined position;

biasing means associated with said first and second pawls for biasing said first and second pawls into said erect positions;

third means for pivotally attaching said second end of said first rocker arm to said frame for movement of said first rocker arm and said first pawl between an extended position in which said first pawl extends beyond said frame for engagement with said cargo and a nested position in which said first pawl lies substantially within said frame;

fourth means for pivotally attaching said second end of said second rocker arm to said frame for movement of said second rocker arm and said second pawl between an extended position in which said second pawl extends beyond said frame for engagement with said cargo and a nested position in which said second pawl lies substantially within said frame;

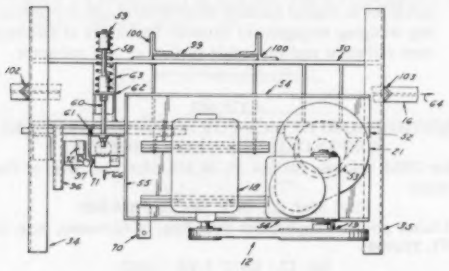
control means disposed within said track means for controlling the position of said pawl; and,

a scissors linkage means associated with said control means and said first and second rocker arms, said scissors linkage means being operable by movement of said control means along the path of the cargo relative to said frame to place said first pawl in said extended position when said second pawl is in said nested position and to place said second pawl in said extended position when said first pawl is in said nested position.

4,175,657
DRIVE UNIT FOR A CONVEYOR CHAIN

Clarence A. Dehne, Farmington Hills, and Martin Pachuta, Troy, both of Mich., assignors to Jervis B. Webb Company, Farmington Hills, Mich.

Filed Jan. 13, 1978, Ser. No. 869,218
Int. Cl.[2] B65G *23/14*
U.S. Cl. 198—833 **10 Claims**



1. In a drive unit for propelling a conveyor chain along a path defined by a conveyor track, said drive unit including a fixed frame and drive means supported thereby for engaging the conveyor chain; a reducer having an output shaft connected to the drive means, an input shaft, and a housing; a motor drivingly connected to the input shaft; and means supporting the motor and reducer for resiliently opposed pivotal movement about the axis of the reducer output shaft in response to torque thereon; the improvement wherein:

said means supporting the motor and reducer comprises bearing means carried by the fixed frame for supporting the reducer housing by the reducer output shaft with the housing spaced from the fixed frame;

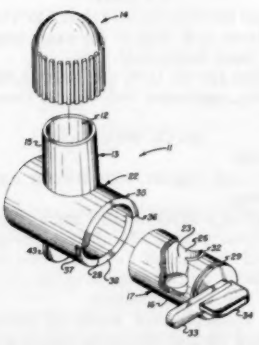
a movable frame attached to and supported by the reducer housing, said movable frame forming a cantilever arm which extends in radial relation to the axis of the reducer output shaft and which pivots about said axis with the reducer housing in response to torque on the reducer output shaft; and,

means for mounting the motor on said movable frame.

4,175,658
DISPOSABLE DENTAL AMALGAM CAPSULE

Billy G. Moser, 1673 Park Vista Dr., and Otto (Bo) Suter, Jr., 1662 Park Vista Dr., both of Chico, Calif. 95926

Filed Feb. 8, 1979, Ser. No. 10,413
Int. Cl.[2] B65D *25/08*
U.S. Cl. 206—221 **4 Claims**



1. A capsular container for storing separate ingredients subsequently to be mixed together within the container, said container comprising:

a. a longitudinal hollow cylinder defining a storage and mixing chamber, said cylinder being open at both ends;

b. a transverse cylinder, intersecting at right angles and in communication with one open end of said longitudinal cylinder, said transverse cylinder being closed at one end and open at the other end;

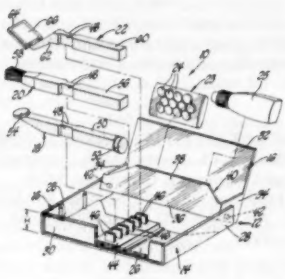
c. a rotary cylinder including a mercury storage compartment, said rotary cylinder being inserted within said transverse cylinder through said other end, said mercury storage compartment being capable of interfacing with the inner wall of said transverse cylinder in a first angular position of said transverse cylinder and interfacing the open end of said longitudinal cylinder in a second angular position of said transverse cylinder; and,

d. a removable cup-shaped cap, capable of sealing the open end of said longitudinal cylinder opposite the end intersecting and in communication with said transverse cylinder.

4,175,659
CLEANING KIT

Richard C. Horian, 1740 Strickland Dr., Bloomfield Hills, Mich. 48013; James Horian, 7340 Indiana, Dearborn, Mich. 48126, and Robert Horian, 5721 Culpepper Ct., W. Bloomfield, Mich. 48033

Filed Jun. 15, 1978, Ser. No. 916,031
Int. Cl.[2] B65D *85/00*
U.S. Cl. 206—223 **7 Claims**



1. A cleaning kit comprising: a rectangularly shaped receptacle including a base member and a cover movable between closed and open positions with respect to said base member; cleaning tools received within the receptacle for storage when the cover is in the closed position; each tool having an elongated handle including oppositely facing recesses; and a tool rack including a pair of projections for securing each tool by an interference fit with the tool handle within its oppositely facing recesses such that the tools are accessible for removal and use when the cover is moved to the open position.

7. A method for providing cleaning tool storage along with boxes for magnetic tape cassettes playable on sound reproducing equipment that can be cleaned by the tools, the method comprising: providing a rectangularly shaped receptacle that is openable and has a length of about 4 and 5/16 inches, a width of about 2 and ¾ inches, and a height of about 11/16 inches whereby the receptacle can be conveniently stored along with or in the space normally provided for tape cassette boxes of a conventional size; and inserting cleaning tools within the opened receptacle for storage upon subsequent closing of the receptacle such that the tools are accessible for removal and use when the receptacle is thereafter opened.

4,175,660

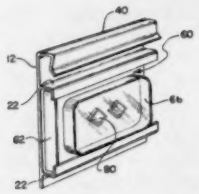
DISPLAY PACKAGE FOR JEWELRY AND THE LIKE

Jeffrey A. Feibelman, Cranston, R.I., assignor to A & H Mfg. Co., Cranston, R.I.

Continuation-in-part of Ser. No. 810,366, Jun. 27, 1977, abandoned. This application Aug. 3, 1978, Ser. No. 930,519

Int. Cl.[2] B65D 73/00

U.S. Cl. 206—468 9 Claims



1. A device for the display of jewelry articles and the like comprising a first panel having means for suspending said device in a generally vertical plane, said first panel including a front face and an opposed rear face, a pair of integral spaced parallel flanges extending rearwardly from said rear panel face and extending transversely of said panel in a side-to-side direction, a second panel received between said flanges and spaced from said rear panel face, said second panel having a pair of end walls at opposite ends thereof extending toward and contacting said first panel rear face, whereby when said second panel is in its assembled position, a complete enclosure is defined at the rear of said first panel for receiving at least a portion of the jewelry article being displayed, said second panel being removably positioned with respect to said first panel, said second panel having walls at all of its edges including said end walls, said second panel having a planar portion substantially parallel to said first panel, said substantially parallel planar portion further having a rearwardly extending deformation in part forming a portion of said enclosure which portion in turn extends rearwardly of said flanges.

4,175,661

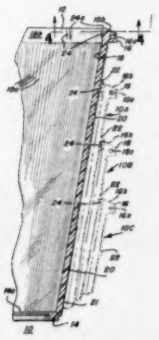
STACKABLE LIGHT REFRACTOR

Jocelyn T. Barnes, Charlevoix, Mich., assignor to Lexalite International Corporation, Charlevoix, Mich.

Filed Aug. 28, 1978, Ser. No. 937,160

Int. Cl.[2] B65D 21/02; F21V 3/00

U.S. Cl. 206—519 15 Claims



1. A light refractor comprising:

an annular, hollow tubular shaped element of light transmissive material having a large end and a pair of spaced apart inner and outer surfaces tapering toward a small end;

said outer surface including a plurality of annular, outwardly projecting ridges of prism shaped transverse cross-section spaced between said larger and smaller ends for directing light rays from a light source centrally disposed in said annular element to pass outwardly therethrough;

one of said prism shaped ridges spaced a distance closer to said larger end than said smaller end projecting outwardly a substantially greater distance than the other ridges of prism shaped cross-section; and

a stacking element adjacent said larger end of said refractor extending radially inwardly of said inner surface and remote from said ridges for stacking engagement with a stop surface on said one prism shaped ridge of an adjacent refractor in coaxial stacked relation therewith for preventing wedging engagement between the ridges of said adjacent refractor and the inside surface of said refractor.

4,175,662

METHOD AND DEVICE FOR SORTING PARTICLES SUSPENDED IN AN ELECTROLYTE

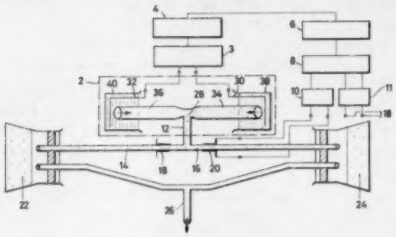
Tibor Zöld, Schmale Strasse 19, 44 Münster, Fed. Rep. of Germany

Filed Mar. 22, 1978, Ser. No. 888,900

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1977, 2716095

Int. Cl.[2] B07C 5/04, 5/342

U.S. Cl. 209—552 38 Claims



1. Method to direct the flow of electrolyte and especially the motion of particles or cells in an electrolyte suspension to sort these particles or cells from a mixture into different containers according to their preselected properties, characterized in that the suspension flows in a middle channel along a preselected length of its trajectory in the form of a very thin stream and can be deflected into at least one side channel, that a pair of control electrodes is located in at least one of the side channels, which produces gas by electrolysis when being activated by an electric current impulse of sufficient amplitude, and that the production of a gas impulse in all side channels with activated control electrodes results in a deflection of the suspension stream into those side channels with inactivated or no control electrodes.

4,175,663

INDEX CARD REGISTER WITH SELECTOR DEVICE

Hans Halm, Herne, Fed. Rep. of Germany, assignor to Firma Niveau AG, Basel, Switzerland

Filed Jul. 10, 1978, Ser. No. 923,388

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1977, 2647067

Int. Cl.[2] B07C 9/00

U.S. Cl. 209—610 6 Claims

1. An index card register with selector means for index cards, comprising:

a housing having a cover member and a bottom member;

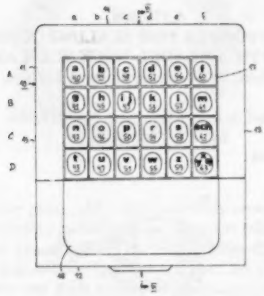
a plurality of plate-shaped selector keys arranged next to one another and rearward or forward of one another;

a drawer biased by a compression spring and adapted to be locked by a locking mechanism;

index cards accommodated within the drawer, the index cards having selector cutouts in their rearward marginal portions and forming a stack of cards;

wherein each selector key is attached to a pivot arm constructed as a lever, which lever is held in its initial position by resilient means and carries at its free end a card retainer device;

wherein the card retainer devices interact with the index cards in such a manner that when a selector key is depressed all those index cards which lie on top of the index card to which this key is assigned are retained when the drawer is drawn out, while the selected index card and all index cards arranged thereunder can be moved out together with the drawer; and



means for unlocking the drawer and releasing the index card which was selected by means of a selector key by pushing out the drawer by means of the compression spring, the drawer being provided with entrainment cams adapted to engage entrainment apertures of the index cards;

said plate-shaped selector keys being square or rectangular and connected with said pivot arms in such a manner that the rearward selector key cantilevers to the left and the forward selector key cantilevers to the right relative to their respective pivot arms.

4,175,664

SEAL ARRANGEMENT FOR A SEPARATING MECHAMISM

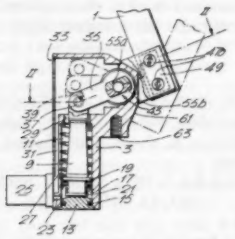
Hans A. Sandbank, London, England, assignor to GEC Medical Equipment Limited, Wembley, England

Filed Feb. 13, 1978, Ser. No. 876,869

Claims priority, application United Kingdom, Feb. 25, 1977, 8044/77

Int. Cl.[2] B07C 9/00

U.S. Cl. 209—657 **7 Claims**



1. A separating mechanism comprising at least one separating unit comprising: a substantially closed casing; a movable finger disposed outside the casing; operating means housed in the casing for moving said finger to effect a separating operation; an axially rotatable shaft extending through the casing and coupled between said movable finger and said operating means whereby motion is transmitted from said operating means to said finger; and a rotary seal arrangement whereby said shaft is sealed to the casing.

4,175,665

DISPLAY CONTAINER FOR ROUNDED ARTICLES

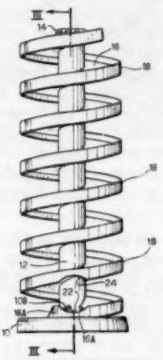
Amilcare Dogliotti, Alba, Italy, assignor to P. Ferrero & C. S.p.A., Alba, Italy

Filed Dec. 16, 1977, Ser. No. 861,338

Claims priority, application Italy, Feb. 7, 1977, 52895/77[U]

Int. Cl.[2] A47F 1/00

U.S. Cl. 211—49 D **1 Claim**



1. A display container and dispenser for spherical articles, comprising:

a base,

a support pillar rigidly secured to and projecting upwardly from said base,

a plurality of turns of a continuous helical web surrounding said support pillar with the innermost edge in contact with said pillar and attached thereto,

a transverse flange extending from the radially outer edge of said web, said flange projecting in opposite directions from said web generally parallel to said support pillar to define, with said web, a helical chute for articles to be contained by said container,

abutment means on said base extending radially with respect to said pillar, said abutment means serving to restrain the lowermost article in said chute,

recess means in said transverse flange at a position adjacent said abutment means whereby to facilitate removal of the lowermost article from said chute by displacing it radially with respect to said support pillar, and

said lowermost end of said helical web being spaced from said abutment means and from said base whereas said transverse flange extends substantially up to said abutment thereby forming a pocket for the lowermost article in said chute.

4,175,666

TANK SUPPORT ASSEMBLIES

Robert G. Smith, Chesterfield, Mo., assignor to Kleen-Rite, Inc., St. Louis, Mo.

Filed Apr. 3, 1978, Ser. No. 893,017

Int. Cl.[2] A47F 5/00

U.S. Cl. 211—71 **8 Claims**

1. A tank support assembly comprising:

a first elongated base member adapted to rest upon a floor surface;

a second elongated base member adapted to rest upon such floor surface and being spaced from and parallel to said first base member;

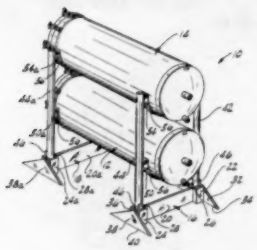
said first and second base members each including, adjacent each end thereof, socket means which are vertically oriented in a stable manner

a first and second vertical post member supported within respective ones of said socket means of said first base member;

a third and fourth vertical post member supported within respective ones of said socket means of said second base member;

at least one hanger bracket on each of said post members;

a first tank support member carried by and between said



hanger brackets on said first and second post members, and a second tank support member carried by and between said hanger brackets on said third and fourth post members; and

an elongated tank supported on said first and second tank support members.

4,175,667

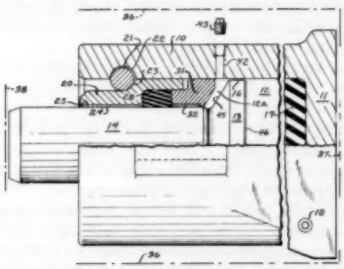
METHOD OF PRESHORTENING DRAFT GEAR

Arthur M. Dillner, Riverdale, and Walter H. Merker, Jr., Downers Grove, both of Ill., assignors to Miner Enterprises, Inc., Geneva, Ill.

Continuation-in-part of Ser. No. 732,902, Oct. 15, 1976, abandoned. This application Jul. 27, 1977, Ser. No. 819,258

Int. Cl.[2] B61G *9/02, 9/04, 9/06, 11/00*

U.S. Cl. 213—40 R **15 Claims**



1. A draft gear for insertion into a pocket in a railway car which pocket has space limitations, said draft gear comprising a body having two ends and defining a cylinder cavity, a piston rod extending into said cavity at one of said ends, a piston secured to said piston rod, positioned within said cavity and movable within said cavity between a retracted position and a position at which the piston rod is fully extended, said piston having two faces, one of which faces surrounds said piston rod, the area of said one face being significantly smaller than the area of the other of said faces, a pressurized fill of flowable, normally solid means within said cavity for resisting draft and buff forces, and means defining a restricted flow passage from one side of the piston to the other through which said fill can flow as draft and buff forces are applied to the draft gear, said draft gear being of a size such that, prior to the draft gear being inserted into the pocket, the distance between the distal end of the piston rod when fully extended and the other end of the body is greater than said space limitations of said pocket, said draft gear prior to installation being characterized by:

said piston being sufficiently retracted within said cavity so that the distal end of the piston rod projects insufficiently far beyond the body to cause the overall configuration of the draft gear to exceed said space limitations;

a first portion of said fill being in the part of the cavity surrounding said piston rod and being sufficiently solid to prevent movement of the piston toward the position at which the piston rod is fully extended in the absence of said forces being applied to the draft gear, and substantially the remaining portion of the fill being in the part of the cavity at the opposite side of the piston, the remaining portion of said fill being less dense than said first portion;

whereby the draft gear is easily insertable into said pocket.

4,175,668

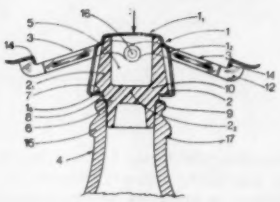
REUSABLE STOPPER FOR SEALING CONTAINERS PROVIDED WITH A BEADED NECK SUCH AS BOTTLES

Jean-Claude Hebert, 34-36 rue de General Leclerc, 51200 Epernay, France

Filed Jun. 2, 1978, Ser. No. 911,943

Int. Cl.[2] B65D *45/04*

U.S. Cl. 215—354 **5 Claims**



1. In a reusable stopper for a container having a neck with an annular bead,

a hollow metal cap having a crimping means,

a one-piece circular deformable body composed of an integral head, collar and skirt,

said head secured within said cap by said crimping means,

the collar disposed between the head and the skirt and having a diameter intermediate the diameter of the head and the skirt but greater than the inner diameter of the container neck,

said skirt having an outer diameter adapted to fit within the container neck and which diameter is less than the diameter of the collar,

the head being generally cup-shaped and open at the top,

the collar depending from the bottom wall of the head and being long enough to prevent the metal cap from contacting the container neck,

a pair of straps pivotally secured to the cap and having arms and having projecting jaws at the ends of the arms to engage the annular bead of the container neck when the skirt is inserted into the container neck.

4,175,669

OVERPACK FOR NUCLEAR FUEL CONTAINER

William R. Housholder, 807 Mullins St., Johnson City, Tenn. 37601, and Norman L. Greer, 1409 Central Ave., Elizabethton, Tenn. 37643

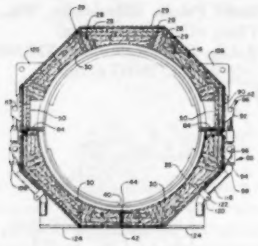
Filed Jul. 1, 1976, Ser. No. 701,893

Int. Cl.[2] B65D *7/02*

U.S. Cl. 220—5 A **4 Claims**

1. An overpack having an elongated shell split longitudinally into an upper section and a lower section, each of said sections comprising dual, spaced, and sealed metal side and end walls tightly surrounding layered oriented wood planks and welded together in an essentially airtight manner, said upper section having a projection on the periphery of its chord face, said lower section having a recess in the periphery of its chord face adapted to receive said projection in a nesting manner, a compressible seal between said chord faces, conduit means in said lower section extending generally longitudinally and radially

inwardly therethrough, a plurality of toggle units longitudinally spaced along each side of the outer walls of said sections, for removably securing said sections together, each of said inner end walls being provided with a bumper assembly comprising arcuate, spaced segments of cushioning material secured at their outer surfaces to the end wall at a position adjacent the periphery thereof and carrying on their inner surfaces



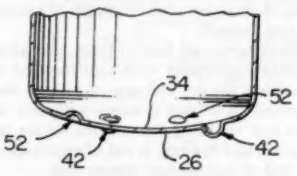
a metal bumper plate, and a skid assembly secured to each end wall and extending radially from between said segments to a point beyond the chord of the end wall, said skid assembly comprising at least one bracket member secured at its outer surface to the end wall and removably carrying on its inner surface a skid plate, cushioning material secured to the end wall and carrying a metal plate on its inner surface in sliding contact with said skid plate.

4,175,670

CONTAINER CONSTRUCTION

William G. Reynolds, Richmond, and Horst F. W. Arfert, Midlothian, both of Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed Mar. 22, 1978, Ser. No. 889,037
Int. Cl.[2] B65D *7/44*
U.S. Cl. 220—70 **12 Claims**



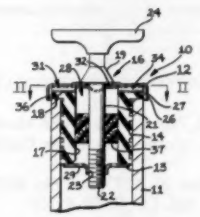
1. In an easily hand-held metal container construction having a downwardly convex bottom wall and an adjoining side wall defined as a single-piece seamless structure with said side wall terminating at a top portion adapted to have a top closure fixed thereon, said top portion, when viewed on a plane perpendicular to the longitudinal axis of said container construction, having a circular cross-section configuration and having a particular diameter, the improvement wherein said bottom wall, when viewed on any cross-sectional plane coinciding with said longitudinal axis of said container construction, has a central part which extends in a circular first radius and a peripheral part defined by a side portion which blends smoothly with said central part and said side wall, said side portion extending on a second radius, said first radius, when measured along the longitudinal axis of said container, being within the range of 2 to 7 times greater than the dimension of said particular diameter and said second radius being within the range of 1/10 to 1/5 the dimension of said particular diameter, said first radius and said second radius having a dimensional ratio which provides a smooth transition between their respective central and peripheral parts which is free of sharp corners and with minimum wrinkling, said downwardly convex bottom wall having a plurality of integral feet for supporting said construction thereon, each of said feet being defined by a downwardly convex dimple having a base portion provided with an outer periphery, and said bottom wall also having a plurality of dimples to rigidify said bottom wall, said rigidifying dimples each being defined by a downwardly concave dimple having a base portion provided with an outer periphery, said outwardly convex dimples and said outwardly concave dimples having a wall thickness which is substantially the same as the remainder of said bottom wall and each of said convex and concave dimples having a central axis and having the outer periphery of its base portion disposed radially inward from said side wall by a distance of at least equal to one-half the minimum dimension across said outer periphery when measured through said central axis, said central part and said peripheral part blending smoothly together substantially on an imaginary circular line and each of said convex and concave dimples being disposed so that the central axis of each dimple is disposed adjacent said imaginary circular line and said concave dimples being symmetrically disposed between said convex dimples.

4,175,671

BREATHER CAP

Harold H. Holl, Oswego, and Walter R. Hupe, Champaign, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 1, 1978, Ser. No. 901,408
Int. Cl.[2] B65D *53/00, 51/16*
U.S. Cl. 220—235 **2 Claims**



1. In a breather cap having first and second plates positioned at opposite ends of a resilient cylindrical element and means for selectively moving the plates toward one another and radially expanding the resilient element, the improvement comprising:

first means for passing air through the breather cap, said first means including a bore extending longitudinally through said resilient element, an orifice extending through said second plate and in communication with said bore, a disc positioned between said first plate and said resilient element, said disc having a central opening in communication with the bore of said resilient element and a groove in the disc connecting the central opening with ambient;

second means for filtering the air passing through the first means; and

wherein said resilient element has a flange extending radially outwardly at the end adjacent the first plate, said first plate having a lip extending longitudinally toward said second plate encircling the flange of the resilient element and spaced therefrom a predetermined distance forming an annular opening, said groove being in communication with said annular opening.

4,175,672

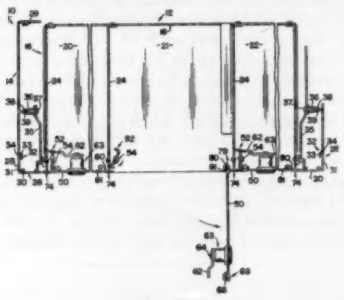
CLOSURE ASSEMBLY

Henry T. Moser, 1451 Cattleman Rd., Sarasota, Fla. 33577

Filed Nov. 20, 1978, Ser. No. 961,956
Int. Cl.[2] B65D *43/14, 51/04*
U.S. Cl. 220—334 **17 Claims**

1. A container structure of the type including a movably mounted closure means providing and preventing access to the interior of such container structure, said container structure

comprising housing means, said closure means comprising at least one closure element pivotally mounted to said housing means and disposable to removably block access to the interior of at least a portion of said housing means, locking means pivotally mounted on said housing and disposed into locking engagement relative to a predetermined portion of said closure



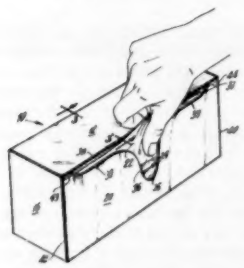
element, said locking means comprising a substantially elongated configuration extending along at least a major portion of the length of said predetermined portion of said closure element and disposed to at least partially define barrier means disposed between the interior of said housing and a junction between said closure means and a substantially correspondingly positioned portion of said housing means.

4,175,673

DISPENSING CARTON FOR CORRUGATED PLASTIC BAGS

James A. McDonald, Palos Heights, and Mark C. Novak, Chicago, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,756
Int. Cl.[2] B65D *85/67*
U.S. Cl. 221—63 **5 Claims**



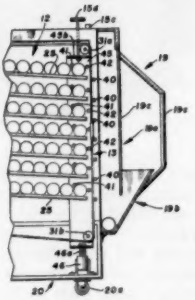
1. In combination, a box-like dispensing carton comprising, a top wall, a bottom wall, end walls and side walls, a single removable access panel located exclusively on one side wall of said carton, and a plurality of bags each having an open end and a closed end, said bags being arranged within the carton in a corrugated configuration with the open end of each bag lying in tandem parallel to said one side wall and being in closer proximity thereto than the closed end of each bag and with said removable access panel forming, upon its removal, a single aperture in the side of the carton for dispensing said bags one at a time, with said aperture having at least one portion defined by an elongated opening of a predetermined width located substantially about the center of said one side wall along its smaller dimension and having a width substantially limited in dimension to an average measurement based upon the placement of a person's thumb lengthwise within said opening and having a length extending a distance along said smaller dimension equal to at least one-half the width of said one side wall measured from the top edge of the carton.

4,175,674

DEVICE FOR SINGULAR DISPENSING OF PACKAGED ARTICLES

Ralph W. Johnson, New Brighton; Emil D. Burrs, St. Paul; Gary L. Smith, Minnetonka; Ronald G. Freund, Bloomington, all of Minn., and Edward Patula, Rhinelander, Wis., assignors to Total Systems, Inc., Minnetonka, Minn.

Filed Aug. 24, 1977, Ser. No. 827,246
Int. Cl.[2] B65G *65/60*
U.S. Cl. 221—88 **9 Claims**



1. A dispensing device including:

a. a support frame;

b. a storage section carried by said support frame including at least one article storage and guiding means and arranged to deliver articles placed thereon from one rearward end thereof to the other forward end thereof;

c. a belt member having at least one article passing opening therein;

d. positioning means carried by said support frame and positioning said belt member with respect to said storage section for the control of the delivery of articles from the forward end thereof;

e. means for shifting said belt to bring said article passing opening into registration with said forward end of said storage section for the delivery of articles therethrough upon registration of said opening with said storage section, said belt retaining the articles within said storage section when said opening is out of registration with said forward end of said storage means; and,

f. article retaining means arranged in close association to said forward end of said storage means to normally retain articles therein and means for shifting said retaining means to permit articles to move forwardly upon shifting of said retaining means.

4,175,675

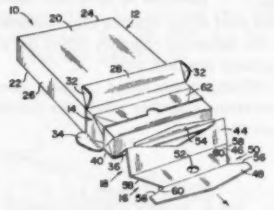
CONTAINER AND DISPENSING PACKAGE

Leo V. Maisonneuve, 4480 N. 40th St., St. Petersburg, Fla. 33714

Continuation-in-part of Ser. No. 730,846, Oct. 8, 1976, Pat. No. 4,109,826. This application Apr. 20, 1978, Ser. No. 898,375
Int. Cl.[2] B65D *5/38*
U.S. Cl. 221—72 **4 Claims**

1. A container and dispensing package for storing and dispensing contents therefrom comprising an outer carton having an opening therein; together with an inner and outer end flap each movable between a first and second position to selectively permit access to the interior of said outer carton through said opening and an opening means comprising an end wall and a separation member each movable between a first and second position to selectively move said inner and outer end flaps from said second position, an inner wrapper fixedly attached to said

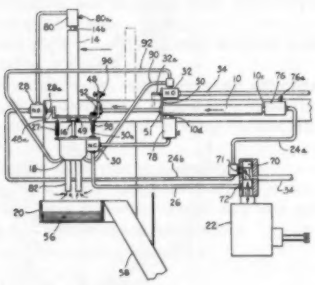
outer carton to protect the contents thereof and disposed to extend outwardly from said opening when said inner and outer end flaps are in said second position and said opening means further includes a pair of wrapper folding and opening elements on opposite sides of said separation member to accommodate folds of said inner wrapper therearound and to open said inner wrapper when said inner and outer end flaps are in said second position, said end wall is disposed inwardly relative to said inner end wrapper and said separation member is disposed between said inner and outer end flaps when each is in said first position.



4,175,676
APPARATUS FOR AUTOMATICALLY FEEDING COLLAR STAYS

Ronnie C. Renaud, Rte. 1, Liberty, S.C. 29675, and Jerry D. Goins, 404 Laurel Rd., Easley, S.C. 29640

Filed Sep. 29, 1977, Ser. No. 838,010
Int. Cl.[2] B65G *59/04*; B65H *5/14*; B23Q *7/04*
U.S. Cl. 221—211 **17 Claims**



1. Automatic feeder apparatus for feeding collar stays to an associated sewing device and the like comprising:

a first fluid cylinder having a pair of inlets and a laterally reciprocating piston rod extending therefrom;

a second fluid cylinder having an inlet and a vertically reciprocating piston rod extending therefrom;

carriage means carried by said piston rod of said first fluid cylinder, said second fluid cylinder being carried by said carriage means;

a pick-up device carried by said piston rod of said second fluid cylinder for picking up a collar stay from an associated magazine;

first valve means having a first position for delivering a fluid from a pressurized fluid source to one of said inlets of said first cylinder and said inlet of said second cylinder to move said pick-up device in first and second directions, respectively, to a stay pick-up position;

said first valve means having a second position for delivering the fluid to the other of said inlets of said first cylinder to move said pick-up in a third direction opposite to said first direction to a stay delivery position;

fluid supply conduit means connecting said first valve means and said inlets of said first and second fluid cylinders for delivering said fluid;

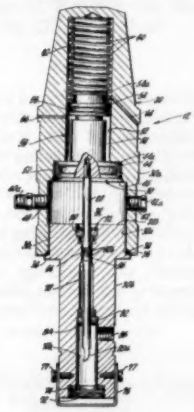
second valve means connected in said fluid supply conduit means between said first valve means and said inlet of said second cylinder responsive to said pick-up device reaching the end of lateral movement at a predetermined lateral position in said first direction for terminating fluid delivery to said second cylinder; and

third valve means connected in said fluid supply conduit between said first valve means and said other inlet of said first cylinder responsive to said pick-up device reaching the end of vertical movement at a predetermined vertical position in a fourth direction opposite to said second direction for allowing delivery of fluid to said other inlet.

4,175,677
SELF-CONTAINED ACTUATION AND DETECTION DEVICE

Paul M. Poeschl, Marinette, and David L. Stockwell, Waukesha, both of Wis., assignors to The Ansul Company, Marinette, Wis.

Filed Aug. 11, 1977, Ser. No. 823,869
Int. Cl.[2] A62C *37/06*
U.S. Cl. 222—5 **10 Claims**



1. A self-contained detection and actuation device for use with a pressurized fluid container having a frangible disc comprising:

an elongate housing having a centrally located pressure cavity;

a first piston chamber adjacent said cavity with one end opening thereto, said first piston chamber having a diameter smaller than said cavity;

a second piston chamber axially aligned with said first piston chamber and having one end opening thereto, said second piston chamber being smaller in diameter than said first chamber;

a passageway extending axially from said cavity opposite said piston chambers;

means for coupling said pressurized container at the end of said passageway with said frangible disc presented thereto;

a double ended piston assembly including first and second pistons slidably received in said first and second piston chambers, respectively, and means interconnecting said pistons for conjoint movement;

means in said second piston chamber for biasing said piston assembly toward said cavity;

an elongate rod axially connected to said first piston and extending through said passageway, the free end of said rod having a piercing element thereon for puncturing said

frangible disc when said piston assembly is moved by said biasing means;

sealing means for dividing said passageway into high pressure and low pressure portions; and

means between said sealing means and said coupling means for withdrawing high pressure fluid from said high pressure portion of the passageway.

4,175,678

EXPLOSION PROOF DEVICE FOR A PRESSURE ACCUMULATOR HAVING A VALVE PORTION

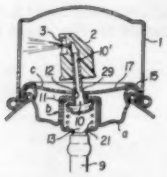
Motoo Fukuda, No. 522, 1305 To, 3-1, Shiomi-Dai, Isogo-Ku, Yokohama-Shi, Kanagawa-Ken, Japan

Filed May 6, 1977, Ser. No. 794,601

Claims priority, application Japan, May 7, 1976, 51-51274

Int. Cl.[2] B65D *83/14*

U.S. Cl. 222—54 **3 Claims**



1. In a pressure accumulator having a valve member adapted to be opened for exhausting gas and other materials from said accumulator by movement of said valve member in a given direction against a biasing force tending to maintain said valve in a closed position, the improvement comprising:

means disposed between said accumulator and said valve member, being responsive to heat of a predetermined degree, for automatically operating said valve member to open said valve for exhausting gas and other material from said accumulator, said means for operating said valve member comprising a bimetallic plate having an opening therethrough for receiving said valve member.

4,175,679

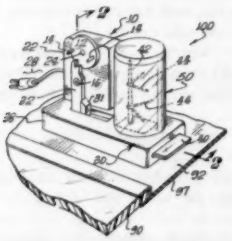
TIMER-CONTROLLED AUTOMATIC ANIMAL FEED DISPENSER

Phillip Ponce, Valinda, and John T. Kamon, Altadena, both of Calif., assignors to Carolyn M. Smith, Los Angeles, Calif., a part interest

Filed Jul. 31, 1978, Ser. No. 929,330

Int. Cl.[2] G01F *11/10*

U.S. Cl. 222—70 **12 Claims**



1. A timer-controlled automatic animal feed dispenser, comprising:

powered timer means including a rotary cam with at least one pin,

a rocker arm pivotally mounted and adapted to engage said timing means,

shuttle means reciprocable between first and second positions and having a metering chamber and a cam follower for engagement by said rocker arm,

spring means biasing said shuttle means toward the first position,

a container for animal feed generally above the shuttle means,

a transfer port in the base of said container communicating with the metering chamber when the shuttle means is in said second position, and

means defining a discharge opening communicating with said metering chamber when the shuttle means is in said first position.

4,175,680

DISPENSING CONTAINERS

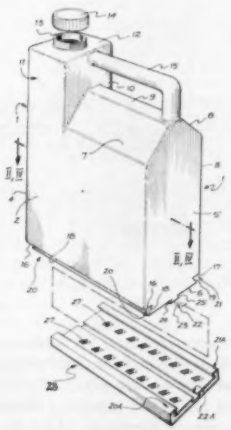
Nicholas Sammut, 220 Newbridge Rd., Moorebank, New South Wales, Australia (2170)

Filed Jun. 8, 1978, Ser. No. 913,603

Claims priority, application Australia, Jun. 9, 1977, 0390/77

Int. Cl.[2] B65D *47/28*

U.S. Cl. 222—465 **2 Claims**

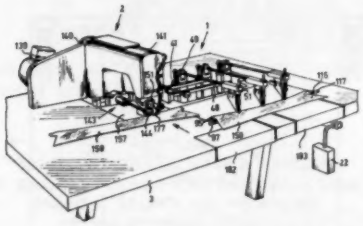


1. A container having a top and bottom and side and end walls, the top of the container having a handle and a filling spout communicating with the interior of the container, the bottom of the container having an array of openings therein, a closure member having an array of openings therein, the side walls of the container and the bottom of the container being provided with slide channels, said slide channels cooperating with slide channel engaging means on said closure member to secure the closure member to the bottom of the container, said closure member being movable from a closed position where the array of openings in the closure member are out of register with the array of openings in the bottom of the container to an open position where the array of openings in the closure member are in register with the array of openings in the bottom of the container for the purpose of dispensing the contents of the container.

4,175,681
APPARATUS FOR MARKING AND TRIMMING COLLARS

Hans Scholl, Oerlinghausen-Lipperreihe, and Helmut Tiemann, Bielefeld, both of Fed. Rep. of Germany, assignors to Koch Adler AG, Bielfeld, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 622,734, Oct. 15, 1975, abandoned. This application Sep. 28, 1977, Ser. No. 837,564
Int. Cl.[2] A41H 9/00
U.S. Cl. 223—2 **16 Claims**



1. An auxiliary apparatus for the final operation of a sewn collar consisting of a bottom fabric layer with a joining edge and a top fabric layer, before sewing onto a shirt or blouse, comprising

a base plate,

marking means mounted on said base plate for marking a collar at a plurality of spots of the bottom fabric layer and at matching spots of the top fabric layer, said marking means including

marking tools,

means for adjusting said marking tools with respect to various collar sizes, and

means on said plate for varying said marking tools for different collar contours,

cutting means mounted on said base plate adjacent said marking means for trimming a joining edge of said bottom fabric layer of said collar after marking by said marking means,

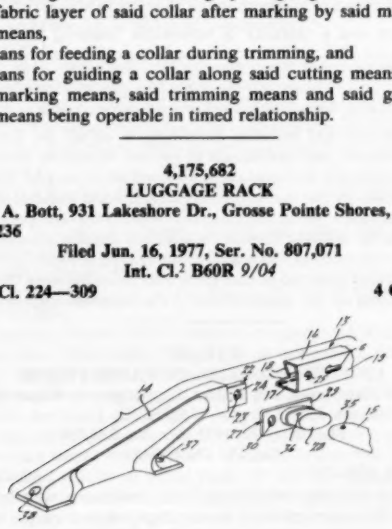
means for feeding a collar during trimming, and

means for guiding a collar along said cutting means, said marking means, said trimming means and said guiding means being operable in timed relationship.

4,175,682
LUGGAGE RACK

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Filed Jun. 16, 1977, Ser. No. 807,071
Int. Cl.[2] B60R 9/04
U.S. Cl. 224—309 **4 Claims**



1. In a luggage rack for an automobile,

a pair of spaced apart side members,

at least one transversely extending cross member,

a pair of stanchions located one at each end of said cross member, with each of said stanchions being associated with one end of one of said side members,

a pair of retainer members associated one with each of said stanchions and with one end of said cross member, and

each of said stanchions having a projecting end portion adapted for telescopic engagement with the end of the associated side member,

each of said side members having an opening and a keyhole slot formed on the interior side thereof,

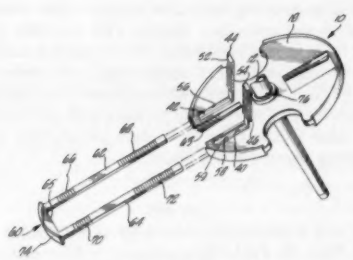
each of said stanchions having an opening which is aligned with the opening in the associated side members upon telescopic engagement of said stanchions therewith,

each of said retainer members having an opening and an outwardly projecting boss which is insertable into one end of the keyhole slot of the associated side member and moveable longitudinally therewithin to a position wherein said retainer opening is aligned with said stanchion and side members openings of the associated side member and stanchion, and a pair of fastening members wherein a fastening member extends through said aligned openings of each associated set of retainer members, stanchions and side members.

4,175,683
SKI POLE BASKET AND CARRYING ASSEMBLY

Michael P. Shields, 5977 Reseda Blvd., Tarzana, Calif. 91356

Filed Mar. 31, 1977, Ser. No. 783,170
Int. Cl.[2] B65D 71/00
U.S. Cl. 224—45 S **4 Claims**



1. A basket assembly for a ski pole for use in securing together a pair of skis and a pair of ski poles to facilitate the carrying thereof, said basket assembly comprising a body member having an aperture extending therethrough for receiving a first ski pole, a first recessed area therein for receiving a portion of a second ski pole, the area defining a curvilinear gripping surface for retaining said second ski pole within said recessed area, said gripping surface defining an outer opening to said recessed area of reduced transverse dimension and a second recessed area radially disposed within said body member at about 90° with respect to said first recessed area for receiving a transverse portion of a pair of adjacently disposed skis, a U-shaped ski locking member defining a bar and leg portions, the bar portion of said ski locking member extending across the outer open end of said second recessed area and being adapted to be disposed about the transverse portion of said skis extending from said second recessed area and the leg portions of said ski locking member extending into said body member about said second recessed area and including means for locking said second portion of said ski locking member within said body member.

4,175,684
MECHANICAL GLASS KNIFE SCORER/BREAKER

James K. Butler, 1412 Woodbine Ct., Arlington, Tex. 76012

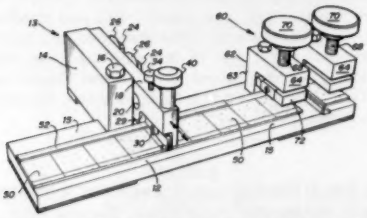
Filed Jul. 31, 1978, Ser. No. 929,856
Int. Cl.[2] C03B 33/02
U.S. Cl. 225—2 **19 Claims**

8. An apparatus for preparing a glass microtome knife of the Ralph-type, comprising:

(a) a rigid base;

(b) a scoring apparatus on one end of the base, including an arm capable of making straight excursions across the top of the base and parallel to the top surface thereof, with said arm carrying a hardened cutting means which is adjustable in height so as to produce a desired score line on a piece of glass supported by a mat on the base;

(c) a glass-breaking apparatus affixed to the other end of the base, with said glass-breaking apparatus having a horizontal mat for catching and supporting broken pieces of glass, with the elevation of said supporting mat in the glass-breaker apparatus being identical to the elevation of a



supporting mat in the glass-scoring apparatus, such that an elongated piece of resilient material may serve both the glass-scoring apparatus and the glass-breaking apparatus; and

(d) the glass-breaking apparatus having a pair of similarly oriented and open-face clamps with movable pressure pads thereon, and there being a linear fulcrum fixed to the base between said pair of clamps, such that a piece of glass may be positioned in the two clamps and over the fulcrum in such a way that applying pressure with the two clamps can cause a glass piece to fracture along a line which is generally parallel to the fulcrum.

4,175,685

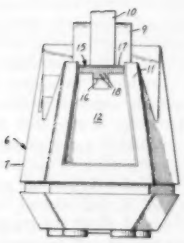
TAPE DISPENSER WITH BLADE GUARD

Gerald J. Niles, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 23, 1978, Ser. No. 918,349

Int. Cl.[2] B26F *3/02*; B26D *7/22*

U.S. Cl. 225—19 **2 Claims**



1. A pressure-sensitive adhesive tape dispenser comprising a frame,

a first support on said frame for supporting a roll of convolutely wound tape,

a second support on said frame which is spaced from said first support and including a smooth surface to which said tape will lightly and detachably adhere by its pressure-sensitive coating and a receptacle for a cutting blade,

said cutting blade comprising a razor blade with a self-contained guard in the form of a flexible material spirally wound to conform with the contour of the blade surface, and capable of being pressed against the razor blade edge by said tape without severance of the flexible material.

4,175,686

DEVICE FOR STRIPPING BLANKS FROM A DIE CUT SHEET OF BLANKS

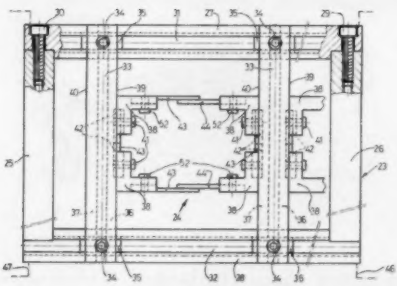
Pierre Lang, Ecublens, Switzerland, assignor to J. Bobst & Fils, S.A., Lausanne, Switzerland

Filed May 24, 1978, Ser. No. 909,034

Claims priority, application Switzerland, May 26, 1977, 6478/77

Int. Cl.[2] B26F *3/02*

U.S. Cl. 225—97 **7 Claims**



1. In a device for stripping blanks from a die cut sheet of blanks, said device including a set of punches mounted on a punch frame and a matrix being supported on a support frame and having openings corresponding to the outlines of both the punches and blanks, one of said frames being movable relaive to the other so that the punches can extend into the openings of the matrix to force the blanks through the matrix openings to strip them from the sheet, the improvements comprising each of the punches of said set of punches comprising a plurality of punch members and means extending between adjacent punch members to close the outline of each punch, said punch members being adjustably mounted on a first set of bars supported on the punch frame and slidable therealong to vary the size of the outline of each punch, said matrix comprising a first set of parallel extending members, a second set of parallel extending members and a plurality of removable fastening means for interconnection, said support frame being rectangular with one set of parallel sides being at one level and second set of parallel sides being at a different level, said first set of parallel extending members being adjustably mounted on said first set of parallel sides and shiftable therealong to adjust the distance therebetween, said second set of parallel extending members being adjustably mounted on said second set of parallel sides to overlie and extend across the first set and being shiftable therealong to adjust the distance therebetween so that the size of the rectangular opening formed by adjacent parallel members of the first and second sets is adjustable, said removable fastening means being disposed at each cross over point between the first and second set for interconnecting the members together.

4,175,687

UNIFORM INDEXING OF PAPER FORMS

Grant F. Kenworthy, Des Plaines, Ill., assignor to Weber Marking Systems, Inc., Arlington Heights, Ill.

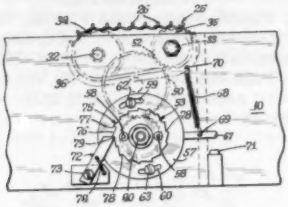
Filed Dec. 27, 1977, Ser. No. 864,336

Int. Cl.[2] G03B *1/30*

U.S. Cl. 226—74 **3 Claims**

1. An indexing mechanism for a continuous web having margin holes comprising a tractor engaging said margin holes, means actuating said tractor including a clutch driving element and a clutch driven element, gearing joining said clutch driven element to said tractor, a ratchet wheel joined to said clutch driven element, a pawl engaging said ratchet wheel, a spring motor, said spring motor having a friction disc engaging said ratchet wheel, said spring motor energized by rotation of said ratchet wheel when said clutch driven element is engaged with

said clutch driving element, said spring motor acting through its said friction disc to reverse the direction of the tractor when



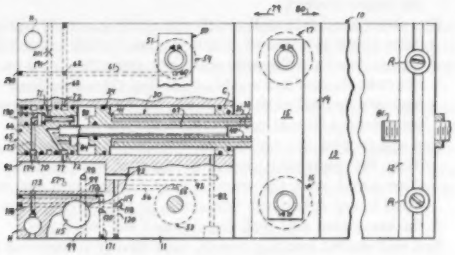
the clutch driving and driven elements are disengaged, and means limiting the amount of reverse movement.

4,175,688

SEMI-AUTOMATIC STOCK FEEDER

Albert W. Scribner, 6 Country Club Rd., Darien, Conn. 06820

Filed Jan. 23, 1978, Ser. No. 871,490
Int. Cl.[2] B65H *17/36*
U.S. Cl. 226—158 **16 Claims**



1. A pneumatic feeder for intermittently advancing strip stock into the work station of a punch press that has a reciprocating working ram; said feeder comprising

a frame;

feed slide means mounted on said frame for reciprocating movement in feed and index directions;

stock gripping means carried by said feed slide means;

a first fluid motor means for actuating said feed slide means;

a second fluid motor means for actuating said stock gripping means;

a main fluid valve means adapted to be shifted between first and second operative conditions;

a third fluid motor means for shifting said main valve means between said first and second operative condition;

a control plunger means adapted to move between first and depressed positions in response to the movement of said press ram;

pneumatic control means adapted to cause said feed slide means to be normally disposed in an indexed position and to cause initiation of a feed stroke of said feed slide means in response to movement of said plunger means from its said depressed position back to its said first position in response to the upward movement of said press ram; and

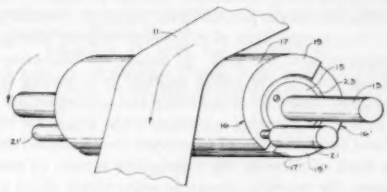
reversing means adapted to be operated in response to the terminal portion of a feed stroke of said feed slide means for causing said first, second and third fluid motor means to initiate an index stroke of said feed slide means whereby said feed slide means returns to and remains in its said indexed position until said plunger means is again moved from its said first to its said depressed position and then returned to its said first position in response to the downward and upward movements respectively of said ram, the next feed index cycle of movement of said feed slide means being initiated in response to this return movement of said control plunger means from its said depressed position back to its said first position.

4,175,689

APPARATUS FOR CENTERING STRIPS IN ROLLING MILLS AND THE LIKE

Calvin E. Parker, 1506 Amber Ct., Ontario, Calif. 91762

Filed Aug. 25, 1977, Ser. No. 827,732
Int. Cl.[2] B65H *23/02, 25/26, 27/00*
U.S. Cl. 226—190 **7 Claims**



1. A steering roll for a strip handling system having a shaft, which roll comprises:

(a) an inner member;

(b) attachment means fixedly engaging said inner member to said shaft for rotation of said inner member with said shaft;

(c) a hollow cylindrical outer shell positioned over said inner member and having two substantially semi-cylindrical segments;

(d) shift means carried within and projecting through said inner member for attaching said outer shell segments to said inner member so that said outer shell segments are held rigidly away from said inner member in the radial direction, and rotate with and may be axially displaced with respect to said inner member; and

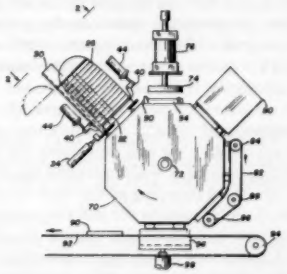
(e) spring means carried in said inner member and disposed parallel to the axis of said shaft and engaging said shift means for urging said shift means to a centered position.

4,175,690

APPARATUS AND METHOD FOR PRODUCING SECTIONED EDIBLES

Mary L. Bova, and Ralph G. Bova, both of 80 Poplar Ave., Deal, N.J. 07723

Filed Jul. 31, 1978, Ser. No. 929,809
Int. Cl.[2] B23Q *7/10*
U.S. Cl. 227—76 **23 Claims**



1. Apparatus for automatically slicing and sectioning an edible such as fruit and delivering said sections to a given station for further processing, said automatic apparatus including: (a) a chute for receiving a plurality of edibles such as fruit, said chute having a discharge sized to pass only one edible at a time to a delivery station; (b) a pusher at said delivery station and reciprocably movable to two limits of movement and at a first limit of movement the pusher allows one edible to pass

from the chute and in way of the pusher when the space below the chute and in front of the pusher is empty; (c) means for reciprocably moving the pusher to two extremes of movement; (d) means carried by the pusher to close the chute discharge to a downward flow of edibles except when the pusher is at said first limit of movement; (e) a slicing grid in the path of an edible as moved by the pusher, the grid disposed to slice the edible into segments of determined thickness when pushed to and through the grid by the advancing and advanced pusher; (f) means on the pusher face to accommodate the grid while advancing the edible sufficiently through the grid for slicing of the edible, this means providing for repeated advancing of the pusher to a second limit of movement without damage to or disarrangement of the grid; (g) means for delivering useful sliced segments of the edible product to a gravity fed slide member; (h) means for transferring and delivering the lowermost slice to an indexing apparatus while means for retaining the above slices is actuated to prevent the unwanted dropping of the stack of slices to the transferring means; (i) means for advancing the indexing apparatus and a single sliced segment to a sectioning station; (j) means for substantially centering the slice and then advancing a sectioning cutter into and through the sliced segment while oppositely disposed means is provided for preventing the sliced product from moving away from the sectioning cutter; (k) means for advancing the index mechanism and the sectioned product as well as the sectioning cutter to a discharge station; (l) means for withdrawing the sectioning cutter from the sectioned slice at this discharge station and depositing the sectioned pieces onto a receiving means, and (m) means for transporting the sectioned segments to other operations which may include individual wrapping of the sections.

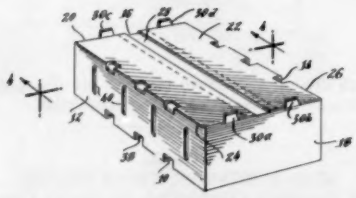
23. A method for automatically slicing and sectioning an edible such as fruit and delivering said sections to a given station for further processing, said method including the steps: (a) receiving and placing a plurality of edibles such as fruit in a chute having a discharge sized to pass only one edible at a time to a delivery station; (b) arranging a pusher at said delivery station and moving this pusher to two limits of movement and at a first limit of movement of the pusher allowing one edible to pass from the chute and in way of the pusher when the space below the chute and in front of the pusher is empty; (c) reciprocably moving the pusher to the extremes of movement during which means carried by the pusher closes the chute discharge to downward flow of edibles; (d) placing a slicing grid in the path of an edible as moved by the pusher, and slicing the edibles into slices of determined thickness when said edible is pushed to and through the grid by the advancing and advanced pusher; (e) providing means on the pusher face to accommodate the grid while advancing the edible sufficiently through the grid for slicing of the edible, this means providing for a repeated advancing of the pusher to a second limit without damage to or disarrangement of the grid; (f) delivering useful sliced segments of the edible product to a gravity fed slide member; (g) transferring and delivering the lowermost slice to an indexing apparatus while retaining the above slices to prevent the unwanted dropping of the stack of slices to the transferring means; (h) advancing the indexing apparatus and a single sliced segment to a sectioning station; (i) substantially centering the slice and then advancing a sectioning cutter into and through the sliced segment while oppositely disposed means is provided for preventing the sliced product from moving away from the sectioning cutter; (j) advancing the index mechanism and the sectioned product as well as the sectioning cutter to a discharge station; (k) withdrawing the sectioning cutter from the sectioned slice at this discharge station and depositing the sectioned pieces into a receiving means, and (l) transporting the sectioned segments to other operations which may include individual wrapping of the sections.

4,175,691

STACKABLE CARTON FOR PERISHABLE COMMODITIES

William F. Cornell, Fresno; John P. Vear, Salinas, and E. Anthony Pascuzzi, El Toro, all of Calif., assignors to Champion International Corporation, Stamford, Conn.

Filed Aug. 24, 1978, Ser. No. 936,612
Int. Cl.[2] **B65D** *13/00, 5/32*
U.S. Cl. 229—36 **12 Claims**



1. A stackable storage and shipping tray comprising:

a generally rectangular floor panel having openings at opposite edges thereof;

first and second side wall panels extending generally upright from opposite edges of said floor panel, each of said side wall panels including side wall flaps extending from opposite ends thereof and a side cover flap extending from the free side thereof, each said side cover flap including recesses adjacent its side edges;

first and second end wall panels extending generally upright from the remaining opposite edges of said rectangular floor panel, with the inner surface of each said end wall panel being adhesively connected to the outer surface of the associated side wall flaps of said side wall; and

first and second stacking panels, each having at least one tab extending upwardly from an upper edge and at least one recess at its lower edge in vertical alignment with said tab, with the outer surface of each said stacking panel being adhesively connected to the inner surface of the associated side wall flaps of said side wall;

said end wall panels, side wall flaps and stacking panels forming triple-ply adhesively connected end wall assemblies wherein each tab on a stacking panel extends through the recess in one of said side cover flaps and each opening at an edge of said floor panel is aligned with a recess at the lower edge of a stacking panel.

4,175,692

ERROR CORRECTION AND DETECTION SYSTEMS

Yutaka Watanabe, Hadano, Japan, assignor to Hitachi, Ltd., Japan

Filed Dec. 22, 1977, Ser. No. 863,089
Claims priority, application Japan, Dec. 27, 1976, 51-156536
Int. Cl.[2] **G06F** *11/12;* **G11C** *29/00*
U.S. Cl. 235—312 **6 Claims**

1. A data error correcting and detecting system for correcting an m-bit error and for detecting an (m+1) or more bit error using a Hamming code comprising:

first means for receiving data and for generating a Hamming code comprising a prescribed number of redundant bits and data bits;

second means, coupled to said first means, for controllably storing said Hamming code;

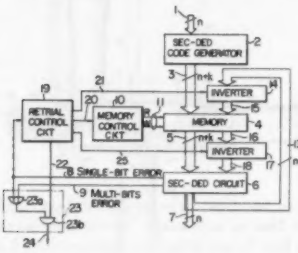
third means, coupled to said second means, for correcting the bit error in said Hamming code and generating a first indication signal representative thereof in response to the bit error in said Hamming code being an m-bit or less error, and for generating a second indication signal in response to the bit error in said Hamming code being an (m+1) or more bit error;

fourth means, coupled to said third means, for controllably

inverting the bit error corrected Hamming code produced by said third means;

fifth means, coupled to said second means, for controllably inverting the Hamming code stored therein;

sixth means, coupled to said second, third, fourth, and fifth means, and responsive to said first indication signal, for controlling said fourth means so that said fourth means inverts the bit error-corrected Hamming code produced by said third means and supplies the inverted-corrected Hamming code to said second means for storage therein,



and for controlling said fifth means so that said fifth means inverts the inverted-corrected Hamming code stored in said second means and supplies the output of said fifth means to said third means; and

seventh means, coupled to said sixth means and coupled to receive said first and second indication signals from said third means, for producing a third indication signal representative of whether or not the operation of said third means has accurately corrected an m-bit or less error in said Hamming code.

4,175,693

METHOD FOR ENHANCING THE RELIABILITY OF OUTPUT DATA FROM A LABEL READER

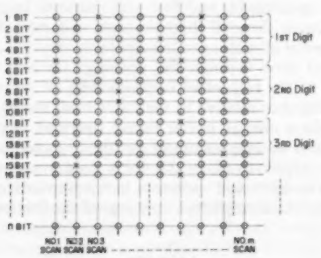
Sadao Nakanishi; Kazuhiro Suzuki; Nobufumi Tokura, and Shinichiro Endo, all of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1978, Ser. No. 891,219

Claims priority, application Japan, Apr. 7, 1977, 52/40141

Int. Cl.[2] G06K *7/14, 9/13*

U.S. Cl. 235—463 **4 Claims**



1. A method for enhancing the reliability of the output data from a label reader having a scanner and adapted to read a bar code consisting of a plurality of bars comprising the steps of:

obtaining a set of binary signals, each signal in said set being representative of a particular different point along a particular bar as scanned by the scanner;

forming a first sum equal to the number of binary "1" signals in said set;

forming a second sum equal to the number of binary "0" signals in said set;

computing the ratio (R) of said first sum to said second sum;

providing a binary "1" output decision for the particular bar if $R>(1+\alpha)$ where $\alpha>0$;

providing a binary "0" output decision for the particular bar if $R>(1-\beta)$ where $0<\beta<1$; and

determining that a reliable output decision cannot be made for the particular bar if $(1-\beta)\leqq R\leqq(1+\alpha)$.

4,175,694

METHOD AND APPARATUS FOR PROCESSING DOCUMENTS

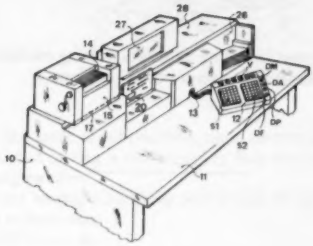
Claude J. Donabin, Angers, France, assignor to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme), Paris, France

Filed Jan. 18, 1978, Ser. No. 870,569

Claims priority, application France, Feb. 3, 1977, 77 02963

Int. Cl.[2] G06K *13/00;* **B25J** *3/00;* **B65H** *5/22, 5/12*

U.S. Cl. 235—475 **12 Claims**



1. A method of processing documents which carries information of a first kind identifiable only by the human eye and information of a second kind identifiable by an automatic recognition device, in which method each document is subjected to two recurrent operating phases including an operation involving the reading and transcribing of the information which it carries and an operation involving the recording of fresh data on the document, the method comprising advancing the documents one after another past a first reading station reading the information of the second kind recorded on a given document by an automatic recognition device at said first reading station, advancing the documents to a second reading station, visually reading at said second reading station the information of the first kind carried by the document and transcribing said information of said first kind by means of an encoding device, advancing said documents to a recording station and recording fresh data on a document which was subjected to a reading operation in the course of the two preceding operating phases while simultaneously reading information of the first and second kind on other documents at said first and second stations.

4,175,695

FAIL-SAFE STACK DAMPER CONTROL SYSTEM

Don E. Cresswell, Dubbs Rd., Sparks, Md. 21152

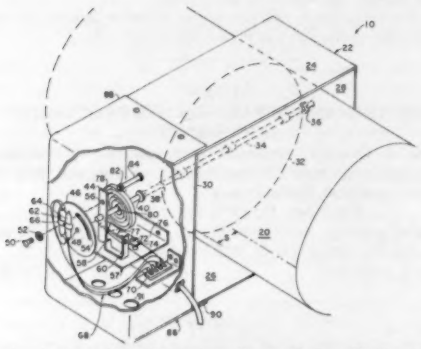
Filed Apr. 14, 1978, Ser. No. 896,482

Int. Cl.[2] F23N *3/00*

U.S. Cl. 236—1 G **12 Claims**

1. In a system for use with a furnace, including means for moving a damper in a flue length for isolating furnace from chimney flue during furnace-off cycle, with a bimetallic strip having heating means, and circuit means for enabling furnace operation in damper-open position and for preventing furnace operation in damper-closed position, the improvement comprising: said means for moving including: a control rod diametrally through the flue length mounting the damper coaxially in the flue length and having extension beyond the flue length, means rotatably mounting the control rod, the bimetallic strip being a coil with the inner end having connection to the control rod and the outer end having connection to the flue length

for rotating the control rod from damper-closed position to damper-open position when heated by the heating means, and



the circuit means including means for causing oscillation of the damper proximate the damper-open position.

4,175,696

THERMOSTATIC VALVE

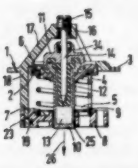
Bernhard W. Braukmann, Mosbach, Fed. Rep. of Germany, assignor to Braukmann Armaturen AG, Rothrist, Switzerland

Filed Nov. 23, 1976, Ser. No. 744,384

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1975, 7537523[U]

Int. Cl.[2] F01P *7/02*

U.S. Cl. 236—34.5 **2 Claims**



1. A thermostatic valve having a working element, a housing enclosing said working element, said housing having a valve seat supported on one side by a yoke and connected on the other side to a plurality of spaced apart holding arms, a guide member for said working element below said valve seat, said plurality of spaced apart arms being attached to said guide member through a corresponding number of slots therein, each of said arms at its free end removed from said valve seat having a claw, each of said slots having a step therein providing a first opening large enough to permit normally disposed passage therethrough of an individual claw and a second opening, communicating with said first opening, to permit lateral passage of the arm supporting said claw on rotation of said arm, thereby resulting in said claw overlying the step in a respective slot, a valve plate above said guide member engageable with said valve seat, and a compression spring mounted on said guide member and bearing against said valve plate, said spring forcing said steps against an individual overlying claw after said arms have been rotated to enter the respective said second openings.

4,175,697

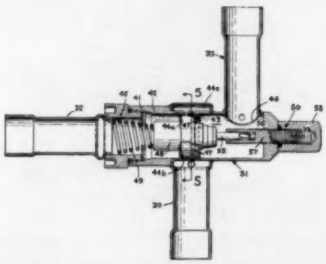
THERMALLY ACTUATED PHASE CHANGE OPERATED CONTROL VALVE FOR USE IN AN ENERGY CONSERVATION SYSTEM

Richard C. Dreibelbis, Fair Lawn, N.J., assignor to Emerson Electric Co. (H&H Precision Products Div.), St. Louis, Mo.

Filed Sep. 1, 1977, Ser. No. 829,777

Int. Cl.[2] G05D *23/00*

U.S. Cl. 236—93 A **7 Claims**



1. A thermally actuated phase change operated valve for controlling flow of fluid comprising:

a. valve body means having walls therein defining a main fluid flow chamber,

b. said valve body means having medially disposed openings through the walls thereof defining first port means, manifold means about said wall means defining a collecting chamber, said first port means connecting said main fluid flow chamber with said collecting chamber,

c. conduit means connected to said valve body means for passing fluid to and from said collecting chamber,

d. said valve body means having second port means and a third port means through the walls thereof respectively disposed on opposite sides of said first port means,

e. at least one other conduit connected to said valve body means for communication with said second port means for passing fluid to and from said main fluid flow chamber,

f. phase change power means freely disposed for sliding movement in said main fluid flow chamber and including, valve head means fixedly connected about the periphery of the medial section of the phase change power means and moveable therewith from an initial calibrated setting relative said first port means,

g. said valve head means having a width less than the width of the openings for said first port means to insure at least a minimum flow of fluid through said main fluid flow chamber at all times and moveable to vary the respective areas of flow through the openings for said first port means to the respective opposite sides of the main fluid flow chamber relative to the valve head means, and

h. said phase change power means operated responsive to variations in temperature of the fluid in said main fluid f flow chamber to move the valve head means to and fro proportional to said variations in temperature for varying the area of the respective openings of the first port means.

4,175,698

METHOD AND APPARATUS FOR CONSERVATION OF ENERGY IN A HOT WATER HEATING SYSTEM

Karl H. Brosenius, Stockholm, Sweden, assignor to Tekram Associates, Inc., North Haven, Conn.

Division of Ser. No. 916,855, Jun. 19, 1978, abandoned. This application Oct. 26, 1978, Ser. No. 954,909

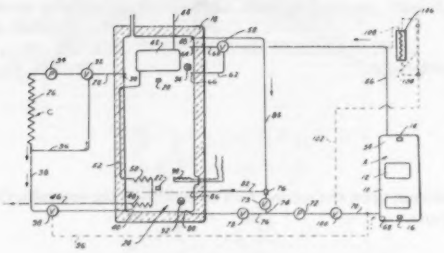
Claims priority, application Sweden, Nov. 11, 1977, 7712275

Int. Cl.[2] F24D *3/00, 3/10*

U.S. Cl. 237—19 **14 Claims**

1. Apparatus for conservation of energy in a hot water heating system of the type comprising a water heating unit and a radiator, the apparatus comprising first and second ports

located near the top and bottom of the unit, respectively; a water storage tank having a capacity greater than the capacity of the unit; third, fourth and fifth ports located near the top, bottom, and a point spaced from the bottom of the tank, respectively; a first conduit operatively connecting said first and third ports, a second conduit operatively connected to said



fifth port, a third conduit operatively connected to said fourth port, valve means operatively connected to said second and third conduits for connecting a selected one of said second and third conduits to said second port, pump means effective, when actuated, to pump water between said unit and said tank and means for connecting said tank to said radiator.

4,175,699

SUPPLEMENTAL AIR CIRCULATOR FOR HOT-AIR FURNACES

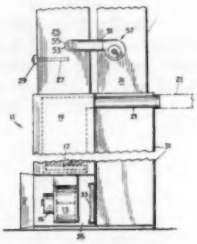
Charles F. Engeling, R.R. #1, Morrisonville, Ill. 62546, and Ralph F. Staubly, 84 Danbury, Springfield, Ill. 62704

Continuation-in-part of Ser. No. 611,357, Sep. 8, 1975, Pat. No. 4,044,950. This application Jul. 12, 1977, Ser. No. 814,899

The portion of the term of this patent subsequent to Aug. 30, 1994, has been disclaimed.

Int. Cl.[2] F24B *7/02*

U.S. Cl. 237—55 **2 Claims**



1. In a forced-circulation air-heating system comprising a conventional fuel-burning hot-air furnace including a hot-air-feed duct system and a cold-air-return duct system, a pipe for conducting flue gases away from said furnace, a first thermostatic switch responsive to the temperature of the space to be heated, fuel-supply means controlled by said first thermostatic switch, a relatively high-power motorized blower for forcing air from said return system through said furnace and to said feed system, an air filter in the air-flow path to and through and from said furnace, a second thermostatic switch located in the hot-air portion of said air-flow path for energizing said high-power motorized blower upon a selected rise in furnace air temperature, the improvement comprising: a relatively low-power motorized blower, and duct means connecting said latter blower so as to force air from said return system into said feed system in bypassing relation to said furnace and its air filter, and means for energizing said low-power motorized blower, whereby during relatively non-heating periods when said high-power motorized blower and said furnace are inactivated, a gentle temperature-stratification-reducing air-flow is produced.

4,175,700

SUPPORT AND/OR LOCATING MEANS FOR RAILS IN RAIL TRACKS

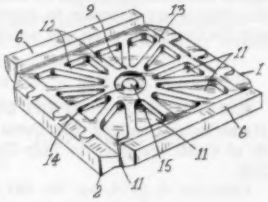
Erich F. Gehrke, Krugersdorp, South Africa

Filed Jun. 10, 1977, Ser. No. 805,455

Claims priority, application South Africa, Jun. 11, 1976, 76/3479; Aug. 26, 1976, 76/5129

Int. Cl.[2] E01B *9/40*

U.S. Cl. 238—299 **5 Claims**



1. A rail pad made of substantially rigid, electrically insulating material and having a rail engaging face and an opposite sleeper engaging face;

said rail pad having a hardness within one of the following ranges of hardness:

(a) 60–80 Shore A,

(b) 62–68 Shore D, and

(c) 60–80 DIN 53456 scale of ball indentation;

said pad having a pair of upstanding, spaced, parallel, rail locating formations on its rail engaging face to operatively receive therebetween a rail foot and having oppositely directed pad locating formations on its sleeper engaging face to operatively co-operate with a sleeper to locate the pad relative to the sleeper;

said pad being provided with a series of recesses in its sleeper engaging face and an unrecessed area outside said recesses;

the unrecessed area of said face being dimensioned to carry an operative load of a required magnitude and the said material being deformable under a predetermined stress to cause said material to flow into said recesses.

4,175,701

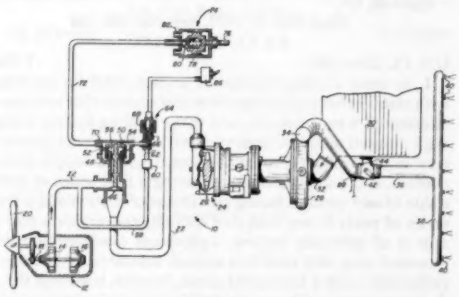
AIRCRAFT SPRAYING SYSTEM AND METHOD

James P. Wojciehowski, and John D. Sullivan, both of Phoenix, Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed May 15, 1978, Ser. No. 905,711

Int. Cl.[2] B05B *17/02*

U.S. Cl. 239—11 **18 Claims**



2. Liquid spraying apparatus for use with an aircraft pow-

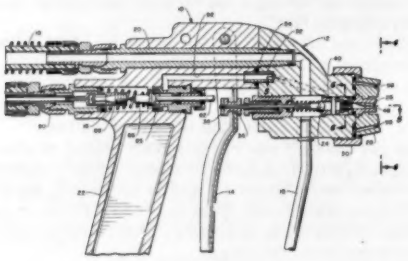
ered by a turbomachinery-type heat engine characterized by the development of a pressurized airflow in the working cycle thereof, said apparatus comprising: an air turbine motor; bleed air duct means for delivering a flow of pressurized bleed air from said working cycle of the engine to said motor to drive the latter; electropneumatic regulating means operably associated with said bleed air duct means for regulating the pressure of said flow of bleed air to said motor to control the speed of said motor; a reservoir for liquid to be sprayed; a liquid centrifugal pump for receiving liquid from said reservoir and discharging a pressurized liquid flow from said pump; and nozzle means receiving said pressurized liquid flow for spraying said liquid from the aircraft at a rate related to the speed of said pump, said pump mechanically driven by said motor whereby said regulating means are operable to regulate said rate of spray of liquid discharged through said nozzle means.

4,175,702

AIR NUCLEATING SPARY GUN

Robert D. Hetherington, Sunland, and David W. Goelz, Burbank, both of Calif., assignors to Poly-Glas Systems, Sun Valley, Calif.

Filed Jan. 6, 1978, Ser. No. 867,654
Int. Cl.[2] B05B *7/08, 15/02*
U.S. Cl. 239—113 **23 Claims**



1. In a spray gun having a handle body with a trigger for controlling the flow of plural components supplied to one or more nozzles the improvement comprising:

a nozzle body attached to said handle body;

a plurality of nozzles attached to said nozzle body, each of said nozzles adapted to spray a separate component;

atomizing means for atomizing one of said components at the outlet to one of said nozzles; and

said atomizing means including deflecting means for creating turbulent flow for mixing said component with forced air before delivery to said nozzle.

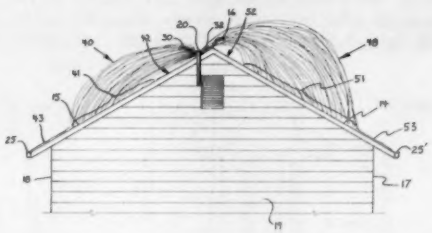
4,175,703

SPRAY COOLING SYSTEM FOR GABLE ROOF

Edgar W. Valiant, Woodstock, Ga., assignor to Spraycool, Inc., Roswell, Ga.

Filed Dec. 9, 1977, Ser. No. 859,168
Int. Cl.[2] B05B *15/00*
U.S. Cl. 239—208 **7 Claims**

1. A spray cooling system for a gable roof (in accordance with claim 1) having inclined first and second roof sections that intersect at a roof summit, said spray cooling system comprising a conduit mounted atop said first roof section adjacent said roof summit adapted to be connected with a supply of liquid coolant, and with said conduit having a first series of ports in a side of said conduit facing said first roof section and a second series of ports facing said roof summit, and wherein said conduit is of generally hollow, cylindrical configuration and is mounted atop said roof first section substantially horizontally (whereby) with a horizontal plane (bisects) bisecting the conduit into upper and lower conduit halves, and wherein said first series of ports is located in said lower conduit half and said second series of ports is located in said upper conduit half, whereby liquid coolant may be sprayed onto the first roof section from the first series of ports and sprayed over the roof



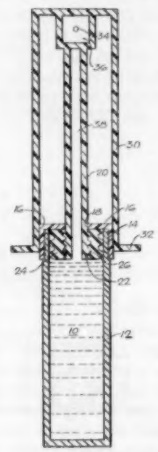
summit upon the second roof section from the second series of ports.

4,175,704

NON-AEROSOL CONTINUOUS SPRAY DISPENSER

Milton J. Cohen, 9201 Persimmon Tree Rd., Potomac, Md. 20854

Division of Ser. No. 658,469, Feb. 17, 1976. This application Sep. 19, 1977, Ser. No. 834,250
Int. Cl.[2] B05B *9/04*
U.S. Cl. 239—320 **14 Claims**



1. A portable hand operated non-aerosol spray device comprising an unsupported elongate container, a plunger slidable within the container in sealing engagement with the side walls of the container, an elongate tubular member having a passage extending continuously therethrough, one end of the tubular member extending through the plunger for communication with the interior of the container, a spray nozzle communicating with the bore at the other end of the tubular member for dispensing liquid material which passes from the interior of the container through the bore of the tubular member to the nozzle in response to decrease in volume occupied by the liquid between the plunger and the bottom of the container, means for effecting relative movement between the plunger and the container limited to the direction towards each other for continued reduction in volume between the plunger and the bottom wall of the container, said means providing a finger grip forming a part of the portable device.

4,175,705

MACHINE FOR THE SPREADING OF MATERIAL IN GRANULAR AND POWDER FORM

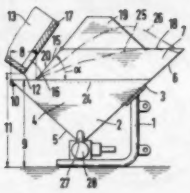
Heinz Dreyer, Hasbergen-Gaste, Fed. Rep. of Germany, assignor to Amazonen-Werke H. Dreyer, Hasbergen-Gaste, Fed. Rep. of Germany

Filed May 3, 1977, Ser. No. 793,448

Claims priority, application Fed. Rep. of Germany, May 8, 1976, 2620413

Int. Cl.[2] A01C *17/00;* B65G *65/30;* E01C *19/20*

U.S. Cl. 239—651 13 Claims



1. A spreader for mounting on a tractor for spreading material in granular and powder form, comprising a hopper-shaped supply container having inwardly, downwardly extending front, side, and rear container walls wherein the front container wall and the side container walls each include an upwardly extending prolongation connected thereto, the prolongations of the side container walls adjoining the prolongation of the front container wall, and the rear edges of the prolongations of the side container walls being inclined forwardly, and distributing means receptive of the material from the container for spreading same during movement of the machine, whereby the carrying capacity of the supply container is increased while an open area is provided above the upper edge of the rear wall and between the side walls for loading of the spreader with said material.

4,175,706

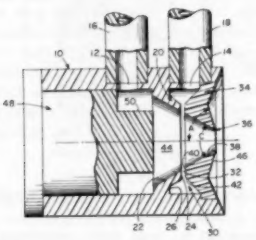
SPRAY NOZZLE

Joseph Gerstmann, Sudbury, Mass., assignor to Scientific Energy Systems Corporation, East Natick, Mass.

Filed Jul. 18, 1977, Ser. No. 816,487

Int. Cl.[2] B05B *7/26*

U.S. Cl. 239—414 17 Claims



1. A spray nozzle particularly suitable for forming a liquid spray of high droplet uniformity with a low pressure gas comprising:

a nozzle body having therein a tubular chamber of generally circular cross-section, said tubular chamber having an axially extending wall surface;

a discharge orifice at one end of said chamber generally coaxial thereto and provided externally of said chamber with a bounding surface which forms an included angle toward the chamber with the axis of said chamber of less than 110°;

an annular outlet in said axially extending wall surface extending as an annulus about the axis of said chamber;

passage means in said body arranged to supply a flow of liquid to be sprayed to said annular outlet for discharge of the same through said annular outlet into said chamber as an annulus about the axis of said chamber; and

means for directing gas under pressure into said chamber in a flow path past said annular outlet and out said orifice, any wall portions of said chamber defining said flow path between said annular outlet and said orifice being convergent toward said orifice in the direction of flow.

4,175,707

HYDRAULIC INSTALLATION

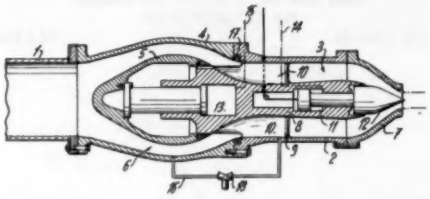
Pierre Piguet, Onex, Switzerland, assignor to Ateliers des Charmilles S.A., Geneva, Switzerland

Filed May 9, 1978, Ser. No. 904,929

Claims priority, application Switzerland, May 12, 1977, 5931/77

Int. Cl.[2] F01D *9/02*

U.S. Cl. 239—456 1 Claim



1. A hydraulic installation for feeding a turbine, comrpising a gate valve and an injector mounted in series in a water inlet conduit, an annular outer casing housing said injector, a nozzle secured to one end of said casing, said injector including a central body, a tip at one end of said central body within said nozzle, a first servo-motor controlling said gate valve, a second servo-motor controlling the tip of the injector, said servo-motors each being disposed in said central body, a single crosspiece securing said central body to said annular outer casing, said crosspiece absorbing the hydraulic forces exerted on the gate valve as well as those exerted on the injector.

4,175,708

METHOD OF TRANSPORTING LIQUID PITCH CONTAINING LUMPY COKES AND APPARATUS THEREFOR

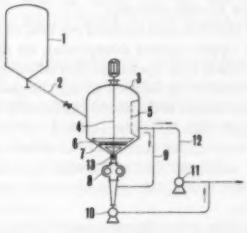
Naoshi Kawabe; Hisatsugu Kaji; Naotaka Miwa, all of Ichihara; Hajime Nakanishi, Fujisawa; Fumiaki Tanaka, Sagamihara, and Tatsuya Inoue, Yokohama, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1978, Ser. No. 870,804

Claims priority, application Japan, Jan. 27, 1977, 52-7304

Int. Cl.[2] B02L *23/00*

U.S. Cl. 241—16 8 Claims



1. A method of transporting liquid pitch containing lumpy

coke produced upon thermal cracking of heavy petroleum oil or coal tar in a reactor, which comprises the steps:

(a) introducing the liquid pitch removed from the reactor into a reception vessel provided with internal means for pulverizing solids, with a side discharge outlet having means for filtration, and with a bottom opening beneath said pulverizing means;

(b) filtering a first portion of the liquid pitch in the reception vessel and removing the filtrate from the vessel through the side discharge outlet;

(c) pulverizing the lumpy coke in the vessel and removing the pulverized coke with a second portion of liquid pitch, as a slurry, through the bottom opening; and

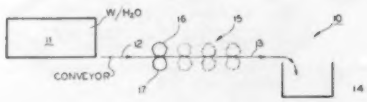
(d) mixing the filtrate and the slurry containing the pulverized coke and feeding the resultant mixture to the suction side of a pump.

4,175,709

METHOD AND APPARATUS FOR SEPARATING FIBERS FROM AGGLOMERATED MASSES THEREOF

Stephen J. Fraenkel, Winnetka, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed Mar. 20, 1978, Ser. No. 888,233
Int. Cl.[2] B02C *4/30*
U.S. Cl. 241—21 **10 Claims**



1. In an apparatus for separating fibers from an agglomerated mass thereof:

(a) at least one pair of rolls having roll surfaces of elastomeric material and arranged to rotate along roll axes to cause said surfaces to move into conjugacy and engage the fiber masses in the nip of said rolls;

(b) each of said rolls having randomly dispersed protuberances thereon which are distorted in random fashion as the roll surfaces move into conjugacy;

(c) said protuberances having initial deformations existing prior to the protuberances moving into conjugacy and being caused by the presence of masses of said fibers;

(d) said protuberances having further deformations causing slipping between the surfaces of the protuberances as they undergo further deformation by the movement into conjugacy to induce shearing and tearing action of said fiber masses and to separate discrete fibers from said masses.

4,175,710

HIGH PERFORMANCE SHREDDER APPARATUS

Steven J. Robertson, 209 Oak St., Cocoa, Fla. 32922

Filed Aug. 11, 1977, Ser. No. 823,649
Int. Cl.[2] B02C *18/22*
U.S. Cl. 241—55 **9 Claims**

1. A shredder apparatus comprising

a housing having side walls and a circumferential end wall defining a hollow chamber,

a rotor located in said chamber,

a plurality of shred heads located on said rotor,

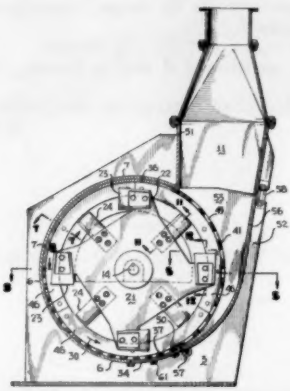
a replaceable ripper screen comprising an arcuate member having a plurality of openings therethrough,

said ripper screen being located along the path of movement of said shred heads and spaced outwardly therefrom by a distance such that objects located between said shred heads and said ripper screen are crushed and torn,

a liner lying adjacent and generally in contact with said ripper screen along the side thereof remote from said shred heads,

a plurality of side wear liners located along said side walls and spaced inwardly from said end wall to define grooves along each side of said chamber, said liners and said ripper screen having edges located in and retained in said grooves, and

a door providing access to said hollow chamber,



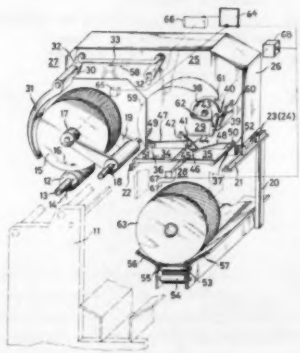
said door having a surface defining one of said side walls whereby upon opening said door said ripper screen may be removed.

4,175,711

DEVICE FOR WITHDRAWING AND TRANSPORTING A WOUND COIL AWAY FROM A WINDING DEVICE FOR TEXTILE FILAMENTS

Heinz Kamp, Rickelrath, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Mönchengladbach, Fed. Rep. of Germany

Continuation of Ser. No. 626,266, Oct. 28, 1975, abandoned.
This application Apr. 18, 1977, Ser. No. 788,160
Claims priority, application Fed. Rep. of Germany, Oct. 26, 1974, 2451001
Int. Cl.[2] B65H *54/20, 54/26*
U.S. Cl. 242—35.5 A **7 Claims**



1. Device for withdrawing and transporting a wound coil away from a winding device for textile filaments comprising a traveling coil exchanging device for sequentially servicing a plurality of winding devices, said coil exchanging device including means for withdrawing a wound coil from a respective winding device, coil storage and delivery means for storing therein the coil withdrawn from the respective winding device, said coil storage and delivery means including a closure device secured on said traveling coil exchanging device against vertical displacement relative thereto and openable in a downward direction for discharging the wound coil therefrom, said coil storage and delivery means comprising a mechanism for

opening the same to discharge the wound coil stored therein, and including a timing mechanism for controlling said withdrawing means and means actuable by the weight of a wound coil in said coil storage and delivery means for initiating operation of said opening mechanism.

4,175,712

CHUCKING SPINDLE FOR THE RECEPTION OF A BOBBIN CARRIER

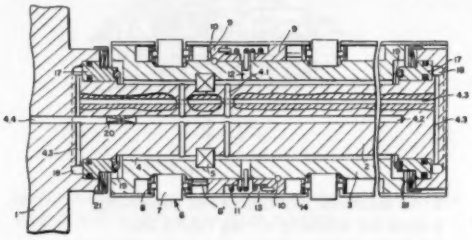
Heinz Schippers, and Erich Lenk, both of Remscheid, Fed. Rep. of Germany, assignors to Barmag Barmer Maschinenfabrik Ag, Remscheid-Lennep, Fed. Rep. of Germany

Filed May 3, 1978, Ser. No. 902,386

Claims priority, application Fed. Rep. of Germany, May 4, 1977, 2719853; Switzerland, Apr. 17, 1978, 4087/78

Int. Cl.[2] B65H *54/54*

U.S. Cl. 242—46.4 **12 Claims**



1. In a thread winding device of the type wherein a chucking spindle adapted for the reception of a removable bobbin carrier is turnably borne on an arm extending from the frame of the machine, and a plurality of clamping places are axially distributed about the outer circumference of the chucking spindle which have clamping elements disposed therein, said clamping elements being radially movable between an extended position in which the bobbin carrier is secured to the chucking spindle and a retracted position in which the bobbin carrier is released to freely slide over said chucking spindle, the improvement comprising:

an actuating means for moving said clamping elements into their retracted position by creating a thrust component which is axially parallel to the axis of said chucking spindle, said actuating means including an annular piston ring which is slidably mounted on and about said chucking spindle and will rotate therewith, a cylinder space into which compressed air is forced to actuate said annular piston ring, said cylinder spaced being arranged behind said piston ring and bounded by said chucking spindle outer circumference and a mantle shell which is arranged coaxially to said chucking spindle, and a compressed air feed channel leading from the frame of said device into a hollow space in the chucking spindle, said hollow space then being connected with said cylinder space by means of bores formed in said chucking spindle.

4,175,713

CONTINUOUSLY OPERATING AUTOMATIC STRIP WINDING DEVICE

Willi Jores, Leverkusen, Fed. Rep. of Germany, assignor to AGFA-Gevaert, A. Ktiengesellschaft, Leverkusen, Fed. Rep. of Germany

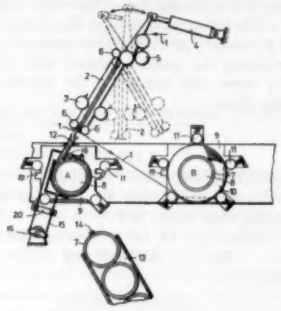
Filed Jun. 9, 1978, Ser. No. 914,053

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1977, 2726856

Int. Cl.[2] B65H *19/26, 19/30*

U.S. Cl. 242—56 R **4 Claims**

1. An automatic strip-winding device for continuously winding a plurality of strips into completed rolls comprising pivotal winding heads, winding starting devices for the strips and depositing devices for the completed rolls, characterized in that there is provided for each of the strips a pivotal threading device with a cutting device thereon and conducting and pressure rollers for supplying running lengths of the strips, two similar winding heads arranged side-by-side at stations A and B with winding motors, a winding starting sleeve at each of stations A and B, tube supply means for providing empty winding tubes to the winding heads, axial moving means on each of the sleeves for applying it over the winding heads and tube to start the winding means for pivoting the threading device between a first position at the first station to first conduct the strip into the sleeve to start it winding on the tube, a second central position between the first and second stations to allow winding the roll completely at the first or second and a third position at the second station shortly before completion of the winding on the winding head at the first station wherein after cutting the strip by means of the cutting device, the strip for the next roll is conducted into the sleeve at the second station to be wound up on the winding head, means to hold the



completed roll together to fix the end of the strip on the circumference of the roll, the winding motors each being mounted on a pivot shaft, a conveyor belt disposed adjacent the first and second stations, means to pivot the winding heads approximately 180° around the shaft of the winding motor to bring a completed roll over the conveyor belt, lifting means connected to the conveyor belt for lifting it against the winding head carrying the completed roll to receive the roll and to lower and carry away the completed roll, the tube supply means including means to take up a new winding tube and apply it to the winding head, whereby after unloading the completed roll the winding head is pivoted approximately 180° C. to the winding and starting position again, the threading device is brought to the second central winding position for completing the winding at the second station and shortly before finishing the roll at the second station is brought to the first position to repeat the winding in an alternating manner.

4,175,714

METHOD AND APPARATUS FOR REELING A PLURALITY OF RIBBONS

George L. Dreher, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed May 18, 1978, Ser. No. 907,186

Int. Cl.[2] B65H *17/08, 17/24, 35/02, 35/04*

U.S. Cl. 242—65 **5 Claims**

1. Apparatus for simultaneously reeling a plurality of traveling ribbons onto a spool comprising, in combination:

a reel including a rotatably mounted drum and a movable pair of primary arms for receiving a spool and selectively positioning the spool circumferentially about the drum and into nipping engagement therewith;

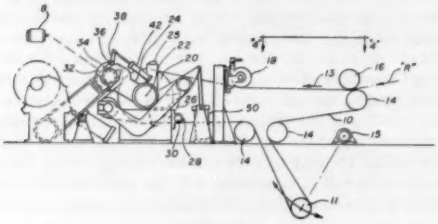
a motor operatively connected with the drum for rotatably driving the drum;

a conveyor for receiving a plurality of traveling ribbons, said conveyor comprising a belt looped about the drum whereby the plurality of ribbons are conveyed over the

drum and into proximity with the spool positioned about the drum surface;

means for selectively moving the conveyor into a first position about the spool for urging the traveling ribbon into initial reeling engagement with the spool and into a second position whereby the ribbons are conveyed over the drum while being wound onto the spool;

a pair of secondary arms movably mounted about the drum for receiving the spool wrapped with ribbons from the primary arms and removing the spool from proximity with the drum.

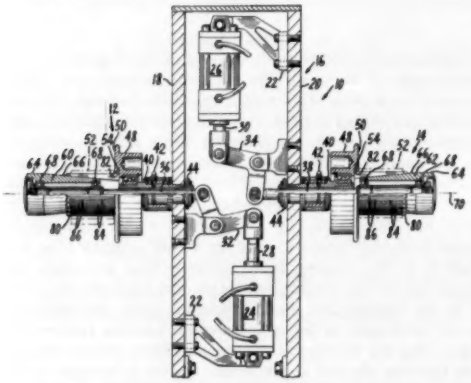


4,175,715

QUICK CHANGE SPINDLE MANDREL

Robert H. Raynor, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Nov. 13, 1978, Ser. No. 959,849
Int. Cl.[2] B65H *75/18, 17/02*
U.S. Cl. 242—72.1 **5 Claims**



1. In spindle apparatus for mounting a reel for winding and unwinding of web material on and off said reel, said apparatus including

a shaft slidable along a fixed axis,

a wedging core fixed to said shaft and concentric with said fixed axis, and

an expandable-contractable mandrel encircling said wedge core and on which said reel is received, sliding of said shaft in one direction effecting movement of said wedging core into contact with said mandrel for expanding same against said reel, sliding of said shaft in an opposite direction effecting movement of said wedging core out of contact with said mandrel for allowing same to contract, the improvement wherein said mandrel comprises

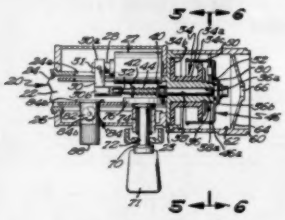
a hollow cylindrical sleeve having an external flange at one end, the sleeve being further characterized by the presence of a plurality of axially directed slits therein extending circumferentially uniformly spaced around the sleeve, adjacent ones of said slits extending from opposite tip ends of said sleeve in the direction of the other sleeve end and terminating closely adjacent to but spaced from the said other sleeve end, the slits intervening a like plurality of ribs in said sleeve, each rib having connecting structure at one end thereof integral with the succeeding next adjacent rib in said plurality and connecting structure at the other end thereof integral with the preceding next adjacent rib in said plurality.

4,175,716

AUTOMATIC SPIN CAST REEL

James R. Reichow, 2912 N. 82nd Cir., Brooklyn Park, Minn. 55444

Filed Apr. 19, 1978, Ser. No. 897,788
Int. Cl.[2] A01K *89/01*
U.S. Cl. 242—84.2 A **9 Claims**



1. An automatic cast fishing reel comprising;

a spool for windably storing fishing line,

means for winding fishing line upon said spool,

said winding means being moveable between a winding position such that the fishing line may be wound upon said spool and a casting position whereby the line is free to unwind during a cast, said winding means being normally in said winding position; and

switching means for moving said winding means between said winding position and said casting position, said switching means being sensitive to the angular orientation of said reel and operative upon movement of said reel to a predetermined angular position relative to the horizontal during casting to move said winding means from said winding position to said casting position to free line for casting, and at least part of said switch means being rotatably mounted to said reel and such that it may be rotated relative to said reel in the plane in which casting takes place in order to adjust said predetermined angle.

4,175,717

OVERHEAD CREEL FOR TWISTING MACHINES

Henri Mathiolon, 18 Rue de Tourvielle, 69005 Lyon, and Simon Charbonnier, 10 Rue Louis Thevenet, 69004 Lyon, both of France

Filed Apr. 21, 1978, Ser. No. 898,594
Claims priority, application France, Mar. 2, 1978, 78 06589
Int. Cl.[2] B65H *49/02*
U.S. Cl. 242—131 **10 Claims**

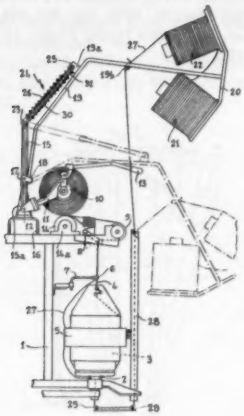
1. A creel for supporting bobbins on a continuous thread twisting machine of the type having a frame and a twisting spindle, the creel comprising:

a bobbin holder plate;

plate support means mounted on the frame of the machine and supporting the plate, the support means being moveable between an operating position in which the bobbin holder plate is elevated above the spindle, and a loading position in which the bobbin holder is lowered to approach the level of the spindle; and

means for locking the plate support means selectively in said operating position or in said loading position, said locking means comprising telescoping slide elements respectively connected to the frame of the machine and to the plate support means, and releasable catch means connected to

the slide elements and automatically engaging when the plate support means reaches either one of the positions to



latch the slide elements to prevent movement of the plate support means toward the other position.

4,175,718

THREAD BRAKE

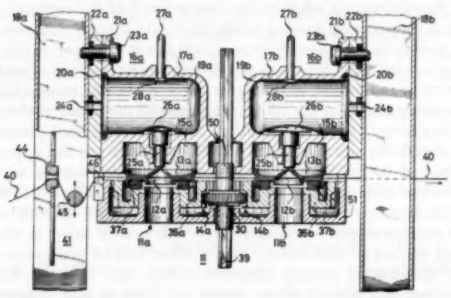
Josef Derichs, and Gerhard Koslowski, both of München Gladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., München Gladbach, Fed. Rep. of Germany

Filed Dec. 26, 1978, Ser. No. 973,531

Claims priority, application Fed. Rep. of Germany, Dec. 27, 1977, 2758335

Int. Cl.[2] B65H *59/22*

U.S. Cl. 242—150 R **3 Claims**



1. Thread brake comprising a lower dish and upper dish, said dishes having confronting surfaces for engaging a thread passing therebetween, a device for applying a load with adjustable pressure to said upper dish for biasing said upper dish towards said lower dish, said device comprising a chamber, an elastic container of variable volume received in said chamber, and a central compressed-gas supply connected to said elastic container, said elastic container being of such size in nonpressurized condition thereof that, upon being pressurized, the elastic wall thereof is not stretched, and plunger means for transmitting the pressure from said elastic container to said upper dish, said plunger means extending through an opening formed in a wall of said chamber and having a contact surface of predetermined size directed against said elastic container.

4,175,719

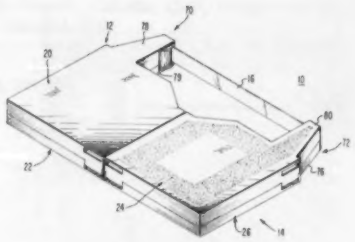
MICROFILM CASSETTE MODULE

Lawrence Speckman, Westland, Mich., and Jack Beery, Fairport, N.Y., assignors to Burroughs Corporation, Detroit, Mich.

Filed Mar. 17, 1978, Ser. No. 887,594

Int. Cl.[2] G03B *23/02*

U.S. Cl. 242—197 **5 Claims**



1. An assembly for housing strip material comprising:

a first cartridge;

a second cartridge;

connecting means for detachably connecting said first cartridge to said second cartridge in a connected position along an axis of the assembly, said axis being perpendicular to a plane formed by the junction of said first and second cartridges and extending through a pivot point, each of said first and second cartridges having a base plate and a cover plate fastened together to define each of said cartridges, said connecting means pivotably connecting said base plates together at said pivot point to allow each of said cartridges to rotate about said axis at said pivot point;

fastener means for detachably fastening each of said cover plates to said corresponding base plate;

a first projecting member connected to said first cartridge and perpendicular to said axis; and

a second projecting member connected to said second cartridge and perpendicular to said axis, said projecting members being spaced from said axis to locate a portion of a strip material to extend parallel to and spaced from said axis between said first and second projecting members.

4,175,720

RETAINER/RELEASE MECHANISM FOR USE ON FIN STABILIZED GUN FIRED PROJECTILES

W. Dale Craig, King George, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 5, 1978, Ser. No. 893,635

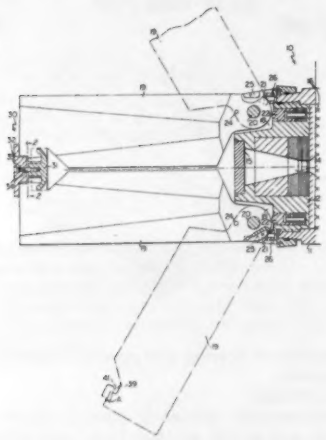
Int. Cl.[2] F42B *13/32*

U.S. Cl. 244—3.28 **2 Claims**

1. A retainer and release mechanism for the centrifugally deployed fins on a fin-stabilized, gun-launched, guided projectile and operable from the forces of projectile launch comprising:

a fin latch of generally cylindrical configuration provided with a plurality of circumferentially spaced notches adapted to engage similarly configured notches formed in the inner edges of the projectile fins thereby defining a plurality of inclined plane mating surfaces sloping inwardly in the forward direction toward the projectile axis, the mass of said fin latch being sufficient when acted upon by the set back or inertial forces of gun launch to hold the notches engaged and retain the fins within the projectile diameter against the urging of centrifugal forces on the fins due to projectile spin during travel down the gun tube, the mass being insufficient to retain the fins when the set back force ceases upon exit of the projectile from the

gun tube whereby centrifugal forces still acting on the fins will cause the fin latch to slide forward along the inclined planes until the notches disengage and the fins are able to complete centrifugal deployment while the fin latch falls away; and



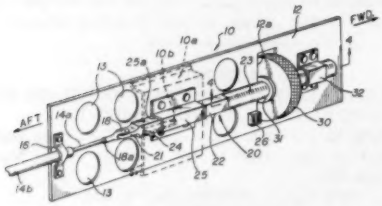
means for retaining said fin latch in engagement with the fins during stowage and handling, said retaining means being designed to fail when set back forces are first applied during launch thereby releasing said fin latch.

4,175,721

TRIM TAB CONTROL MECHANISM

Bernard J. Lempa, Jr., 8422 Carvel St., Houston, Tex. 77036

Filed Jun. 30, 1977, Ser. No. 811,907
Int. Cl.[2] **B64C** *13/04, 13/30*
U.S. Cl. 244—83 F **9 Claims**



1. Apparatus for controlling the movement and position of the trim tab of an aircraft having a cockpit therein comprising:

elongated stabilizer means mounted in said cockpit of said aircraft for reciprocal forward and aft movement and having a threaded portion and a portion of substantially square cross-section thereon, said square portion being mounted in a bracket having a substantially square opening so as to permit said forward and aft movement of said stabilizer means but preventing rotation thereof;

cable means connecting said stabilizer means to said trim tab for said movement and positioning thereof in response to said reciprocal movement of said stabilizer means; and

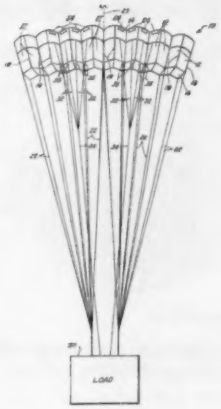
a control member threadedly engaging said threaded portion of said stabilizer means and manually engageable and rotatable from inside said cockpit for translating rotation of said control member to said reciprocal movement of said stabilizer means.

4,175,722

CONTROL SYSTEM FOR RAM AIR GLIDING PARACHUTE

Michael W. Higgins, 6431 Oakhurst Pl., Dayton, Ohio 45414

Filed Mar. 30, 1978, Ser. No. 891,877
Int. Cl.[2] **B64D** *19/00, 17/02, 17/18*
U.S. Cl. 244—152 **2 Claims**



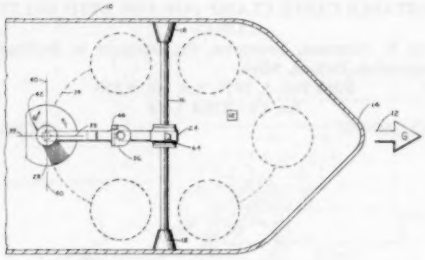
1. In combination with a ram air parachute for supporting a load and having an airfoil shaped canopy with a first fabric layer forming the upper surface of the airfoil shaped canopy and a second fabric layer spaced from the first layer and forming the bottom surface of the airfoil shaped canopy; a plurality of fabric layers interconnecting the first fabric layer and the second fabric layer and dividing the space between the first and second fabric layers into a plurality of channels with the number of channels on one side of a centerline passing through the center of the canopy and the center of the load being equal to the number of channels on the other side of said centerline; said channels being closed at the rearward end of the canopy and having ram air inlets at the forward end of the canopy; a system for inducing turning moments in said canopy, comprising: means, in the upper surface of said canopy, for selectively reducing the lift to drag ratio of said canopy on one side of said centerline and means, in the upper surface of said canopy, for selectively reducing the lift to drag ratio of the upper surface of the canopy on the other side of said centerline; said means for selectively decreasing the lift to drag ratio on the upper surface of the airfoil on one side and the other side of said centerline including means for providing a plurality of first porous areas in the upper surface of said canopy on one side of said centerline and a plurality of second porous areas in the upper surface of said canopy on the other side of said centerline; non-porous closure elements within said channels for covering said porous areas; means for holding said closure elements over said porous areas; means for selectively opening the closure elements on one side of said centerline and means for selectively opening the closure element on the other side of said centerline; said closure elements comprise a plurality of flap elements secured to the bottom surface of said first fabric layer adjacent the porous areas and on the ram air inlets side of the porous areas; said means for holding the closure elements over said porous areas including resilient means secured to said flap elements and to the first fabric layer on the side of said porous areas remote from said ram air inlets; said means for selectively opening the closure elements including a plurality of control lines passing through the second fabric layer, with each of the control lines having one end attached to one of said flap elements adjacent the position where the resilient means are secured.

4,175,723

METHOD AND APPARATUS FOR NEUTRALIZING THE EFFECT OF ACCELERATING AND DECELERATING FORCES

Frederick L. Shea, Jr., Johnson City, Tenn., assignor to Great Lakes Carbon Corporation, New York, N.Y.

Filed Apr. 3, 1978, Ser. No. 892,998
Int. Cl.[2] B64G *1/00;* B64D *11/06*
U.S. Cl. 244—162 4 Claims



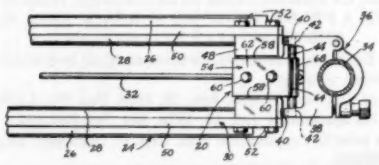
1. In a flight or space travel vehicle developing extreme forces of acceleration, a first means to orient one or more occupants of said vehicle in form-fitting restraints effective in all axes such that an imaginary Z-axis parallel to the spinal column and through the center of mass of cross-section of the body and the head perpendicular to the Z-axis is oriented normal to the resultant of said forces of acceleration at any time that a predetermined level of said forces is exceeded, with second means to rotate said occupants about said Z-axis, said first means comprising a rigid axle transverse to the longitudinal axis of said vehicle, a first swivel joint with a rigid extension angularly movable through 360° in a first plane normal of said axle being mounted on said axle, on said rigid extension a second pin swivel joint angularly movable through 180° in a second plane coincident with and in the plane of said axle, a personnel carrier with said form-fitting restraint dependent from said second pin swivel joint, a means for rotating said personnel carrier about said Z-axis, the whole having freedom of movement such that said Z-axis is automatically positioned normal to the resultant of said forces of acceleration, and said personnel carrier is rotated about said Z-axis at any time that a predetermined level of said resultant of forces of acceleration is attained.

4,175,724

SPRING CLIP BREAK-AWAY

Robert S. Bauman, St. Charles, Mo., assignor to St. Louis Die-casting Corporation, Bridgeton, Mo.

Filed Aug. 1, 1977, Ser. No. 820,813
Int. Cl.[2] B63H *21/26;* F16M *1/02*
U.S. Cl. 248—642 17 Claims



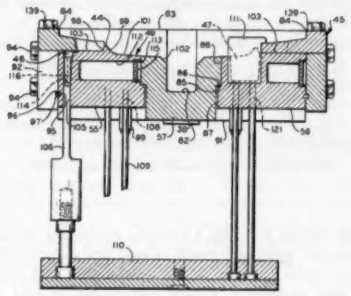
1. A boat motor retracting device having a plurality of support arms, said support arms extending between the boat and the boat motor, at least one yieldable attachment means securing the boat motor to a support arm, said yieldable attachment means including a spring means and a pin means, said spring means comprising two opposing members, each member having an arcuate section defining a recess, said recesses cooperating to yieldably retain the pin means, and means to maintain said spring means aligned with said pin means as said yieldable attachment operates to thereby minimize the force applied to said spring means.

4,175,725

BATTERY STRAP AND POST CAST-ON MULTI USE MOLD

John D. Cattano, Castalia, Ohio, assignor to Dale Products, Inc., Fremont, Ohio

Filed Nov. 10, 1977, Ser. No. 850,100
Int. Cl.[2] B22D *9/06, 9/08, 19/04, 23/04*
U.S. Cl. 249—81 13 Claims



1. A mold assembly for casting straps and posts on plates of lead-acid storage batteries, comprising a base having an upper surface provided with an elongate channel defined by side-wall portions and having a molten metal receiving region cooperating with said elongated channel and a molten metal exit region spaced from said receiving region cooperating with said elongate channel, said channel being adapted to be selectively blocked, by blocking means associated with said exit region, to the flow of molten metal downstream of said receiving region to cause the flowing metal introduced at said receiving region to overflow the side wall portions of said elongate channel; an insert associated with said base having a generally horizontal upper surface and having a hollow interior beneath said generally horizontal upper surface; means maintaining said insert in molten metal tight relationship to said base adjacent said channel with said upper surface of the insert in molten metal overflowing relationship to said channel side wall portions; means operatively associated with the insert for introducing a coolant fluid into the hollow interior of said insert; a mounting surface on said insert; an adapter member separably mounted on said mounting surface of said insert in molten metal tight relationship to said mounting surface, said adapter member having a top surface higher than said mounting surface of said insert when mounted thereon and provided with cavities located in the top surface thereof, said upper surface of said insert having a plurality of cavities adapted to be filled by overflowing metal from said channel; and a perimeter dam associated with said adapter member surrounding said cavities in said insert and adapter member and said channel in said base for containing said overflowing molten metal on said upper and top surfaces.

4,175,726

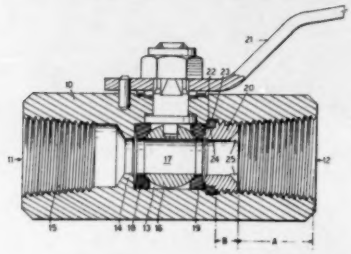
BALL VALVE AND SEAL

Cecil G. Richards, Aspley, Australia, assignor to B.C. Richards & Co. Pty. Ltd., Geebung, Australia

Filed Aug. 8, 1977, Ser. No. 822,943
Claims priority, application Australia, Aug. 6, 1976, PC6904
Int. Cl.[2] F16K *5/06*
U.S. Cl. 251—315 1 Claim

1. A ball valve of the type having a body; a ball chamber in the body; inlet and outlet passages in the body; the inlet passage leading to, and the outlet passage leading from, the ball chamber; a diametrically apertured ball in the ball chamber;

means for rotating the ball to open or close the way from the inlet passage to the outlet passage; a pair of sealing rings engaging the ball about the inlet and outlet passages; an annular insert threadedly engaged in the outlet passage and adapted to be screwed into the outlet passage towards the ball to force the sealing ring in said outlet passage into firm engagement with the ball, said annular insert being substantially cylindrical and engaged in a cylindrical threaded inner part of the outlet passage, the outer part of the outlet passage being formed with an internal tapered thread tapering towards the said cylindrical threaded inner part of the outlet passage; a peripheral annular rebate at the axially inner end of the annular insert, the rear



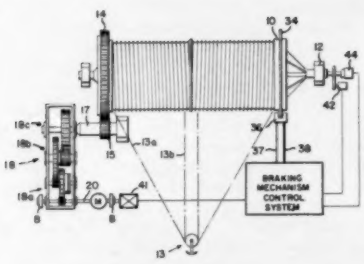
face of said rebate forming a radially extending contact surface; an annular groove formed in said body about the inner part of said outlet passage; and a deformable ring positioned partly in said peripheral rebate and partly in said annular groove, the front face of said deformable ring, when said annular insert is in an assembled position, contacting the front face of said groove and the outer peripheral edge of the rear face of said sealing ring in said outlet passage, and the rear face of said deformable ring contacting the radial rear face of said rebate thereby to provide solid line contact at both the front and rear faces of said deformable ring to provide a fluid tight seal.

4,175,727

SINGLE FAILURE PROOF CRANE

Charles W. Clarke, Seattle, Wash., assignor to Ederer Incorporated, Seattle, Wash.

Filed Mar. 6, 1978, Ser. No. 883,531
Int. Cl.[2] B66D *1/48*
U.S. Cl. 254—173 R **14 Claims**



1. A safety system for a hoisting crane having a drum, a cable on the drum, a high-speed motor, a load drive train coupling the motor to the drum, said load drive train including a speed reduction unit, the improvement comprising:

emergency holding means for stopping instantaneously rotation of the drum, said holding means being located outside of the load drive train so that the drum will not rotate where a failure occurs in any portion of the load drive train,

said speed reduction unit having at least higher-speed and lower-speed reducing stages, passive energy-absorption torque-limting means located in and comprising a part of the higher-speed stage for allowing continued movement of the higher-speed stage and motor when the drum is stopped by the holding means and for dissipating the kinetic energy of the higher-speed stage and motor until the motor and higher-speed stage are brought to rest,

means for detecting a failure of said load drive train,

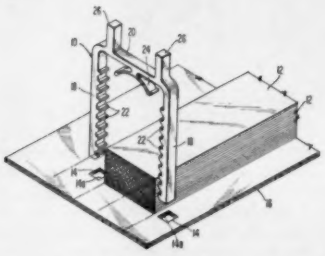
means for engaging the holding means in response to said detecting means when a failure condition is detected.

4,175,728

ADJUSTABLE CABLE CLAMP FOR USE WITH BELTED CABLES

Thomas R. Ferguson, Levittown, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 1, 1979, Ser. No. 8,610
Int. Cl.[2] B25B *5/14*
U.S. Cl. 269—91 **7 Claims**



1. A clamp for use with at least a single belted electrical cable routed between a pair of apertures formed in an equipment chassis comprising:

a substantially U-shaped structure including a pair of legs and a base, said base supporting said legs in substantial orthogonal relationship therewith and in parallel spaced-apart relationship with each other, said pair of legs having respective pluralities of homologously disposed teeth on opposed inner surfaces thereof,

a spring member disposed on the inner surface of said base between said pair of legs,

a pair of spaced-apart projectons disposed on the outer surface of said base,

said pair of legs being adapted to be inserted respectively in said pair of apertures formed in said chassis and to be advanced in the direction of said cable until said spring member is in firm contact therewith, said chassis then being forcibly engaged by corresponding teeth in the respective pair of legs, the subsequent removal of said clamp being effected by the movement of said pair of projections toward each other and the resultant disengagement of said teeth with said chassis.

4,175,729

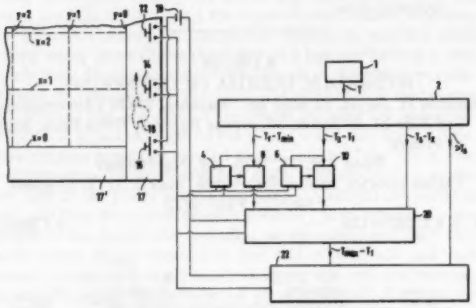
METHOD AND APPARATUS FOR PRODUCING METAL BLANKS, IN PARTICULAR STEEL SLABS, WHICH AT LEAST IN A PREDETERMINED SURFACE AREA HAVE SUBSTANTIALLY NO DEFECTS

Per-Olle Karlsson, Oxelösund, Sweden, assignor to Svenskt Stal Aktiebolag, Sweden

Division of Ser. No. 677,078, Apr. 15, 1976, Pat. No. 4,138,277.
This application Jan. 13, 1978, Ser. No. 869,291
Claims priority, application Fed. Rep. of Germany, Dec. 29, 1975, 2558966
Int. Cl.[2] B23K *7/06*
U.S. Cl. 266—51 **10 Claims**

1. Apparatus for producing metal blanks, in particular steel slabs, which at least in a predetermined surface area have substantially no defects therein, at least a surface portion to be made free of defects being divided by a coordinate system into coordinate fields and, at least one inspecting means for system-

atically and substantially completely scanning the coordinate fields for detecting defects and the depth thereof occurring within respective coordinate fields and/or within adjacent coordinate fields, means for classifying the detected defects into a plurality of depth classes, means responsive to the maximum defect depth or maximum defect depth class determined for at least one coordinate field for controlling the working depth of a working means for removing the detected defects, means for detecting the number of defects and the depth thereof occurring within a coordinate field and/or within



adjacent coordinate fields, and means for marking at least a portion of the coordinate field or adjacent coordinate fields of the surface portion of the metal blank when the detected number of defects exceeds a predetermined defect minimum number and/or for changing the weighting accorded the detected defects with respect to a single defect in the classification of at least one selected maximum defect depth or maximum defect depth class when the detected number of defects of the at least one maximum defect depth or maximum defect depth class exceeds a predetermined minimum number of defects.

4,175,730

DEVICE FOR COOLING A QUENCHING BATH OF MELTED SALT

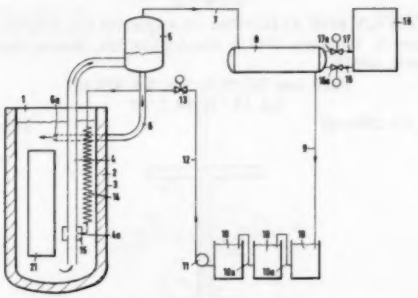
Berthold Kranz, Duren, Fed. Rep. of Germany, assignor to Firma Carl Canzler, Düren, Fed. Rep. of Germany

Division of Ser. No. 593,256, Jul. 7, 1975, Pat. No. 4,072,298. This application Feb. 3, 1978, Ser. No. 874,814

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1974, 2433539

Int. Cl.[2] C21D *1/64, 1/66*

U.S. Cl. 266—120 **9 Claims**



1. A device for cooling a treatment bath of melted salt into which heat is being introduced by the work or substance which is being treated therein, as when hot workpieces are quenched, for example, the salt bath cooling device comprising in combination:

a treatment tank holding therein said treatment bath of melted salt;

means associated with said tank for heating and initially melting the salt for said treatment bath;

a circulation pipe mounted in such a way in relation to the treatment tank that the pipe has a lower open end immersed in the salt bath and an upper end portion leading out of the salt bath to a level above the latter;

an expansion tank communicating with the upper end of the circulation pipe;

a return pipe running from the expansion tank to the treatment tank;

a condensation tank connected to the expansion tank by means of a steam conduit, and including means for cooling and condensing a medium flowing through the condensation tank;

condensate recirculation means establishing a flow connection between the condensation tank and the bottom portion of the circulation pipe inside the treatment tank;

means for adjusting the condensate flow rate in the condensate recirculation means; and

heat exchanger means associated with said condensate recirculation means for heating a medium flowing therethrough; and wherein

the recited constituent parts of the salt bath cooling device are adjusted to cooperate in such a way that a primary cooling medium, having a vaporization temperature which is considerably lower than the normal temperature of the melted salt, when flowing through the condensate recirculation means to the treatment tank, is partially evaporated by said heat exchanger means, prior to entering said circulation pipe at its bottom portion, thereby coming in direct contact with the salt bath and evaporating in its entirety, while moving upwardly inside said circulation pipe to said expansion tank and entraining with it a flow of melted salt, and this melted salt flow is separated from the gaseous cooling medium in the expansion tank, returning to the treatment tank via said return pipe, while the cooling medium flows through said steam conduit to the condensation tank, where it is condensed, prior to re-entering the condensate recirculation means.

4,175,731

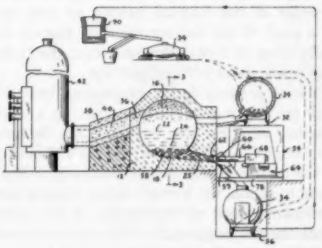
METHOD AND MEANS FOR UTILIZING WASTE HEAT OF MOLTEN SLAG

John S. Overdeck, 425 McKinley, Hobart, Ind. 46342, and John M. Overdeck, 9650R Covered Wagon Dr., Laurel, Md. 20810

Filed May 12, 1975, Ser. No. 576,350

Int. Cl.[2] C21B *3/04*

U.S. Cl. 266—142 **10 Claims**



1. A waste heat and molten metal recovery system comprising:

a molten slag producing apparatus;

a reservoir basin for said molten slag, said basin comprising end walls, side walls, a floor, and a cover, a slag discharge opening in one of said end walls of said basin, said floor being slanted upward toward said slag discharge opening, a plugged aperture in a side wall of said basin at the nadir of said floor slant, and a slag entry aperture in said side wall of said basin elevated above the level of said slag

discharge opening and adjacent the other end wall of said basin;

a slag conveying means exterior of said basin at said slag discharge opening of said basin;

a heat utilizing apparatus exterior of said basin;

a heat insulated passageway connecting said basin and said heat utilizing apparatus and communicating the interior of said basin above said slag discharge opening with said heat utilizing apparatus;

track means between said slag producing apparatus and said slag entry aperture of said basin;

a second track means extending from said first mentioned track means to below said plugged aperture of said basin; and

a vessel movable on said first and second track means for receiving molten slag from said slag producing apparatus and discharging said molten slag through said slag entry aperture into said basin, and for receiving molten metal from said plugged aperture when unplugged.

4,175,732

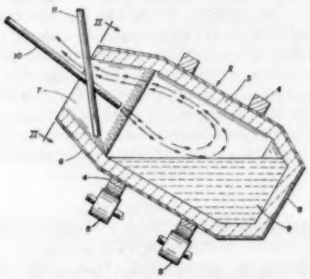
MELTING OF FINE PARTICULATE MATERIAL IN A HIGH-SPEED ROTARY FURNACE

Louis H. Jaquay, Pittsburgh, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Division of Ser. No. 764,083, Jan. 31, 1977, Pat. No. 4,094,667. This application Mar. 24, 1978, Ser. No. 889,743

Int. Cl.[2] F27B *7/32, 7/34*

U.S. Cl. 266—213 **2 Claims**



1. Apparatus for melting finely divided particulate material, comprising:

(a) an axially rotatable furnace of circular transverse section with an open forward end and having a closed rear end, the interior of the furnace having an area arranged to retain a pool of the molten material therein terminating inwardly from said open forward end, the interior of the furnace being lined with refractory;

(b) a material feeding lance projecting into the furnace through said open end, the lance having a discharge end terminating adjacent the lining of the furnace and the forward edge of the pool area of a pool of molten material when the pool has reached the limit which the furnace is designed to retain, the furnace lining sloping downwardly at the lowest point of revolution of the furnace lining adjacent the discharge end of the material feeding lance toward the rear end of the furnace but forwardly of the pool of molten material whereby particulate material discharged by the lance while the furnace is rotating will melt and drain into the pool area;

(c) a burner lance entered into the said open end of the furnace at a level above the discharge end of said material feeding lance, arranged to project a flame downwardly and toward the closed end of the furnace at an angle such that the flames impinge the surface of molten material in the pool at a level above the discharge end of the material feeding lance, the open end of the furnace providing the outlet for the combustion gases generated by the burner whereby the lining of the furnace at a level removed from the discharge end of the material feeding lance is heated as the furnace rotates to melt the particulate material after it has been deposited on the lining while avoiding entraining to any substantial extent the particulate material in said combustion gases; and

(d) means for rotating the furnace about its axis of rotation at a speed sufficient to centrifugally retain said solid material against the refractory lining as it is carried by rotation of the furnace upwardly away from said low point of revolution until it liquefies and flows into the molten metal pool retaining area.

4,175,733

HYDRAULIC INERTIA FILLED SPRING

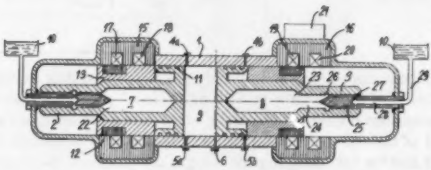
Jacques H. Jarret, 32 allée des Soudanes, 78430 Louveciennes, and Jean M. B. Jarret, 30, avenue Raphaël, 75016 Paris, both of France

Filed Apr. 28, 1978, Ser. No. 900,869

Claims priority, application France, May 5, 1977, 77 13691

Int. Cl.[2] F16F *9/22*

U.S. Cl. 267—126 **6 Claims**



1. Hydraulic inertia filled springs particularly for alternating machines, comprising a fixed part with a free end, a moving part, means for displacing the moving part with respect to the fixed part between a position of outer dead center and a position of inner dead center, the fixed part being innerly provided on at least a portion of its length with an axial bore, a reservoir of liquid communicating with said axial bore, the axial bore having at least one outlet aperture, the moving part being filled with the same liquid as the reservoir and surrounding the fixed part on a portion of its length, the portion of the moving part surrounding the fixed part having an inside recess, the inside recess of the moving part being substantially in front of the outlet aperture of the fixed part at the position of outer dead center and substantially in front of the free end of the fixed part at the position of inner dead center.

4,175,734

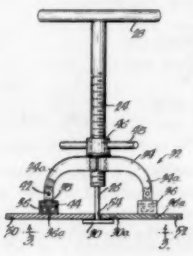
DEVICE FOR ALIGNING PLATES TO BE JOINED

Stanley B. Williams, 2088 E. Empire Lot 151, Benton Harbor, Mich. 49022

Filed Jun. 23, 1978, Ser. No. 918,467

Int. Cl.[2] B25B *5/14*

U.S. Cl. 269—49 **3 Claims**



1. A device for positioning a pair of plates in aligned edge to

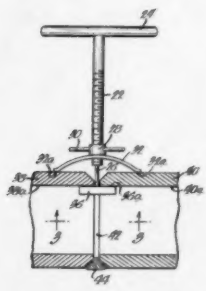
edge relationship with the edges closely spaced together in order that the edges may be joined by welding or the like, comprising a first plate clamp engageable with the surfaces of the plates on one side thereof when adjacent plate edges to be joined are in closely spaced relationship; a second plate clamp engageable with the surface of the plates on the opposite sides thereof when the edges are in the closely spaced relationship, said second plate clamp comprising a main body member having at least four legs extending therefrom for engaging the other plate surfaces with ends thereof, and means for selectively moving said first and second clamps toward and away from each other to grip the plates therebetween to hold the same in position for joining the edges thereof and for releasing the plates for removal of the device therefrom, said first plate clamp being generally in the shape of a bar and having a relatively long dimension and a relatively short dimension perpendicular thereto enabling extension and retraction of said clamp to adjacent the one side of the plates through the space between the adjacent edges of the plates when said long dimension extends generally parallel to the length of the space, and enabling engagement of said first guide with the surface on the one side of the plates when said clamp is adjacent the surfaces and said long dimension extends generally perpendicular to the length of the space, and including an elongated rod, said first plate clamp being secured to one end of said rod and said second plate clamp being movable along said rod, said moving means providing for movement of said second clamp along said rod toward and away from said first clamp, said first clamp and said rod thereat being extendable through the space between the adjacent edges of the plates, said body member of said second plate clamp having a passage formed therethrough, said rod extending through said passage and being formed with threads at least along a medial portion thereof, said second clamp being movable along said rod with said passage around said rod, said moving means including an adjustment lever threadably engaged with said threaded portion of said rod and rotatable to selectively move said second clamp along said rod toward said first clamp or to enable said second clamp to be moved along said rod away from said first clamp, and further including a plate engaging pad at the end of each body member leg, each pad being pivotally connected with its associated leg for movement in orthogonal directions to accommodate uniform movement of said pad against the plate surface despite irregularities in the linearity of the surface.

4,175,735

DEVICE FOR ALIGNING PIPES TO BE JOINED

Jerry R. Griffin, 476 E. Blue Grass Rd., Mt. Pleasant, Mich. 48858

Filed Jun. 23, 1978, Ser. No. 918,466
Int. Cl.[2] B25B *5/14*
U.S. Cl. 269—49 **6 Claims**



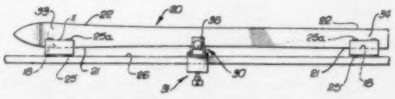
1. A device for positioning a pair of pipes in aligned relationship end to end in order that the ends may be joined by welding or the like, the pipes having passages therethrough of substantially equal diameter, comprising an inner pipe guide engageable with the surfaces of the pipe passages when adjacent pipe ends to be joined are in closely spaced relationship; an outer pipe guide engageable with the outer surfaces of the pipes when the adjacent ends are in the closely spaced relationship, and means for selectively moving said inner and outer guides toward and away from each other to grip the pipes therebetween to hold the same in position for joining the ends thereof and for releasing the pipes for removal of the device therefrom, said inner pipe guide having a relatively long dimension and a relatively short dimension or thickness perpendicular thereto enabling insertion and removal of said inner guide into and from the pipe passages through the space between adjacent ends of the pipes when said long dimension extends generally perpendicular to the lengths of the pipes, and enabling engagement of said inner guide with the pipe passage surfaces when said guide is in the passages and said long dimension extends generally along the lengths of the pipes, and including an elongated rod, said inner pipe guide being secured to one end of said rod and said outer pipe guide being movable along said rod, said moving means providing for movement of said outer guide along said rod toward and away from said inner guide, said inner guide and said rod thereat being extendable through the space between the adjacent ends of the pipes, said outer pipe guide being generally elongate and having a slot formed therethrough, said rod extending through said slot and being formed with threads at least along a medial portion thereof normally exterior of the pipes, said moving means including an adjustment lever threadably engaged with said threaded portion of said rod and rotatable to selectively move said outer guide along said rod toward said inner guide or to enable said outer guide to be moved along said rod away from said inner guide.

4,175,736

SKI HOLDING SYSTEM

Robert W. Dietlein, 3040 Deár Run Rd., Carson City, Nev. 89701

Filed May 15, 1978, Ser. No. 905,595
Int. Cl.[2] A63C *11/04*
U.S. Cl. 269—88 **15 Claims**



1. A non-skid ski holder, comprising

(a) a block having first and second opposite sides, and opposite ends,

(b) a longitudinally elongated slot sunk in the block from said first side, the slot extending through said opposite ends, said first and second sides extending in the direction of said slot, and with relative taper angularity corresponding to ski camber, and

(c) non-skid means carried by the block and exposed at both said first and second sides, said non-skid means having generally longitudinally spaced portions,

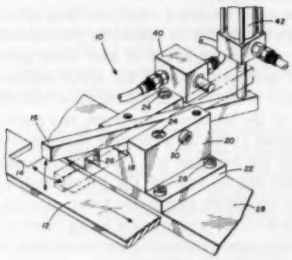
(d) whereby a ski may be placed downwardly in said slot and retained in position by the block with said non-skid means at said second side engaged against a supporting surface, and a ski upper surface may alternatively be placed downwardly on the non-skid means on said first side.

4,175,737

STOP MECHANISM

Steven K. Foss, Carrollton, Tex., assignor to Krestmark Industries, Inc., Lewisville, Tex.

Filed Jun. 23, 1978, Ser. No. 918,650
Int. Cl.[2] B23Q *3/00*; B26D *5/28*
U.S. Cl. 269—317 **15 Claims**



1. For use in controlling advancement of a workpiece along a feed path, a stop mechanism comprising:

structure located adjacent the feed path and defining a predetermined groove with bottom and side walls;

an arm supported in the groove for pivotal movement about first and second substantially orthogonal axes;

said arm being supported about an aperture therethrough defined by inwardly tapered surfaces intersecting at a circular edge between opposite sides of said arm, said circular edge defining means for pivoting said arm about one of said orthogonal axes;

means for biasing the front end of the arm pivotally about the first axis into engagement with the workpiece;

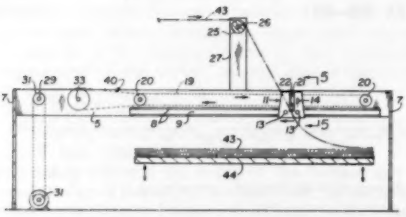
means for biasing the front end of the arm pivotally about the second axis in a direction against the feed direction of the workpiece.

4,175,738

HORIZONTAL FOLDER WITH VARYING SPEED TRAVERSE

Frank Catallo, 84 Wheatley Rd., Old Westbury, N.Y. 11568

Filed Feb. 13, 1978, Ser. No. 876,982
Int. Cl.[2] B65H *29/46*
U.S. Cl. 270—30 **13 Claims**



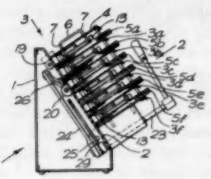
1. In a folder for a continuously advancing fabric web; a pair of horizontal longitudinally extending spaced parallel frame members; a transverse guide roll assembly supported by said frame members for reciprocation therealong and including a pair of rotatable guide rolls; said guide rolls being rotated at a substantially uniform speed; transverse draw roll fixedly mounted on said frame members in a plane above that of said guide rolls for advancing the fabric web to said guide roll assembly; means for driving said draw-roll at a substantially uniform speed; and continuously operable cyclic means for both reciprocating said guide roll assembly and for progressively increasing the speed of reciprocation thereof at the beginning portion of each stroke of reciprocation to a maximum speed during the middle portion of each said stroke and then progressively slowing the speed of reciprocation thereof as said assembly approaches the end of each said stroke.

4,175,739

PAPER COLLATING MACHINES

Jack V. L. Kemp, Dunstable, England, assignor to Kemp Applications Sales Limited, New Malden, England

Filed Jun. 22, 1978, Ser. No. 918,187
Claims priority, application United Kingdom, Jul. 21, 1977, 30697/77
Int. Cl.[2] B65H *39/05*
U.S. Cl. 270—58 **12 Claims**



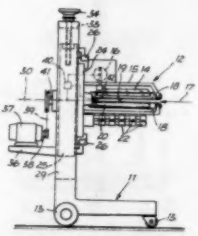
1. In a paper collating machine comprising a plurality of paper holders, each of which is adapted to hold a stack of rectangular sheets of paper, means mounting said paper holders in a row, and means for feeding the top sheet from the stack of sheets of paper in each holder in a predetermined direction with one edge of each sheet leading, the improvement wherein said means mounting said paper holders supports said paper holders in a position inclined transverse to said predetermined direction, means defining a lower side edge of each holder, means defining a supporting surface at said lower side edge of each of said holders parallel to said predetermined direction, said supporting surface, in use, being operative to engage and support one side edge of said stack in said holder and said mechanism being operative to feed said sheets slidingly along said supporting surfaces, and all of said supporting surfaces lying in a common plane whereby said sheets from all of said stacks are laterally aligned with each other as they are fed in said predetermined direction by said feed mechanism.

4,175,740

FOLDING MACHINE

Emil Klenk, Murrhardt, Fed. Rep. of Germany, assignor to Maschinenbau Oppenweiler GmbH, Oppenweiler, Fed. Rep. of Germany

Filed May 1, 1978, Ser. No. 901,334
Claims priority, application Fed. Rep. of Germany, May 3, 1977, 2719784
Int. Cl.[2] B65H *45/18*
U.S. Cl. 270—83 **14 Claims**



1. Folding machine having a machine frame and a knife folding mechanism for folding a sheet introduced in said folding machine, said knife folding mechanism comprising a fold-

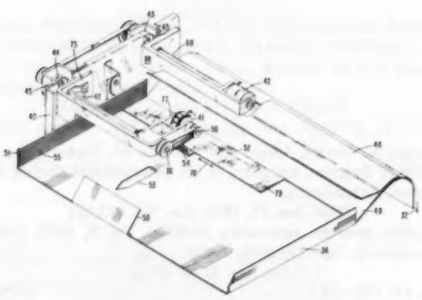
ing knife, said folding knife being mounted for reciprocating movement in an essentially vertical direction, an essentially horizontal aligning plane for aligning the sheet to be folded with respect to said folding mechanism, a conveyor means for conveying a sheet introduced into said folding machine to said aligning plane in a feeding direction, a pair of folding rollers between which the sheet to be folded is introduced by said folding knife from said aligning plane, said knife folding mechanism being rotatably mounted in said machine frame about an axis of rotation which is located in said aligning plane and parallel to said feeding direction, said folding machine further comprising locking means for locking said folding mechanism in a selected one of at least two angular positions about said axis of rotation, and drive means for driving said folding knife, said conveyor means and said folding rollers.

4,175,741

CUT-SHEET XEROGRAPHIC COPIER HAVING COMBING WHEEL SHEET FEED AND A DUPLEX BIN WITH AN ADJUSTABLE BOTTOM-OF-THE-BIN PAD

Donald F. Colglazier; John L. Fallon; George P. Kimble, all of Longmont, and Fred R. Mares, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 19, 1977, Ser. No. 861,914
Int. Cl.[2] B65H *3/06*
U.S. Cl. 271—3.1 **9 Claims**



1. A sheet fed printing device capable of selectively operating in a simplex or a duplex copy mode, having at least one paper supply drawer and a duplex bin wherein side-one printed sheets are stored prior to side-two printing, and having means operable to control the serial feeding of sheets from said duplex bin to a printing station, said duplex bin comprising:

a fixed position, substantially horizontal surface member adapted to support side-one copied sheets;

a movable mounted combing wheel overhanging said surface member so as to cooperate with the top sheet of paper in the duplex bin, said combing wheel normally being raised from said surface member to facilitate the automatic depositing of side-one printed sheets in said duplex bin, said combing wheel comprising a rotatable support member rotatable about an axis and carrying a series of independently rotatable rollers at its periphery;

combing wheel control means operable to control movement of said combing wheel to shingling engagement with the top sheet in said duplex bin;

a resilient pad mounted on said surface member below said combing wheel, said resilient pad being movable in the direction of combing wheel movement so as to enhance shingling of the bottom several sheets in said duplex bin; and

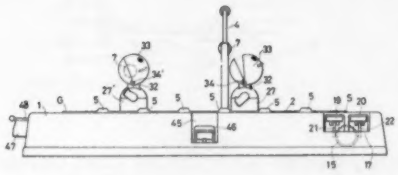
means facilitating adjustment of said pad generally parallel to said axis so as to control the direction of shingling of said bottom several sheets by said combing wheel.

4,175,742

GAME BOARD

Masatoshi Todokoro, 2-33 Koganehara 2-chome, Matsudo, Chiba, Japan (270)

Filed Dec. 16, 1977, Ser. No. 861,123
Claims priority, application Japan, Jul. 29, 1977, 52/101368[U]
Int. Cl.[2] A63F *9/14*
U.S. Cl. 273—1 R **7 Claims**



1. A game board comprising in combination:

(a) a base board with an upper surface and an underside, a suitable number of elongated slots defined in said upper surface;

(b) a bar with a horizontal portion bridging said elongated slots, said bar having rods suspended from said horizontal portion opposite said respective elongated slots, said rods having a lower end, each of said rods having magnetically attached to said lower end an object to be caught;

(c) endless belts along said slots and moving means to move said endless belts along said respective elongated slots, and moving means being provided at the underside of said base board beneath said respective elongated slots, each of said belts having thereon an animated figure with a body portion so disposed that said body portion rises above said upper surface;

(d) a first bar supported in the body portion of each of said animated figures so as to be vertically movable, said first bar having a bar portion extending from the top of said body portion to its bottom and a projecting portion projecting out from the underside of the base board, the projecting portion of said bar being loaded with a bias spring adapted to force said bar to its lowermost position while the bar portion extending in the body portion of each of said animated figures is sheathed by a slide cylinder, said slide cylinder being mounted with a hollow head portion of the animated figure, said head portion being split so that it may open, said head portion also having a second bar engaged with said first bar so as to open or close the head portion in accordance with the movement of said vertically movable first bar;

(e) a first spring disposed between the vertically movable first bar and the associated slide cylinder, said first spring urging said slide cylinder to close the head portion of the animated figure;

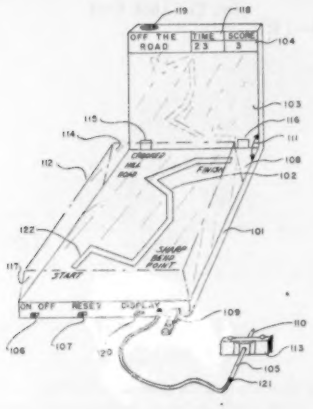
(f) a second spring disposed between each of said slide cylinders and the body portion of each animated figure, said second spring being adapted to press said slide cylinder against said first bar when the latter moves up and to disengage said first bar from said slide cylinder when the slide cylinder has ascended a predetermined distance together with said first bar; and, d

(g) a push-up bar provided horizontally along the area of passage of the lower end of each of said vertically movable first bars, said push-up bar being adapted to push up said vertically movable first bar.

4,175,743
ELECTRONIC GAME

Gene Messina, 12 Buccaneer La., East Setauket, N.Y. 11733

Filed Dec. 19, 1977, Ser. No. 861,847
Int. Cl.[2] A63F *9/14*
U.S. Cl. 273—1 E 2 Claims



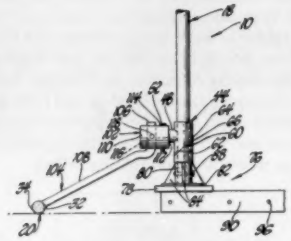
1. A game comprising:
(a) a pair of two generally parallel conductors shaped to form a track,
(b) a wand having a handle for controlling the position of said wand by hand, and a conductive tip with a width less than the spacing between said conductors to pass said tip between said conductors without contacting them when the wand's position is carefully controlled by hand,
(c) an indicator to indicate contact of the tip with either conductor,
(d) means for electrically connecting said indicator to said track and to said tip to transmit a signal to said indicator when there is contact between the tip and track,
(e) a reflective surface positioned for indirect viewing of said track,
(f) means for controllably preventing direct viewing of the track by the operator, said means, for preventing direct viewing is a cover and said provision for controlling the wand beneath the cover includes a first opening in said cover for controlling said wand directly by hand, said cover is a polarized filter which passes light from a nonpolarized light source and blocks light from a cross polarized light source,
(g) a cross polarized light source positioned to illuminate said track,
(h) a nonpolarized light source positioned to illuminate said track, and
(i) means for selectively activating each light, whereby the game may be viewed directly through the cover when the nonpolarized light source is activated, but can only be viewed indirectly by way of the reflective surface when only the polarized light is activated.

4,175,744
EYE-HAND COORDINATOR

Link W. Llewellyn, Flint, Mich., assignor to Chi Rho Corporation, Flint, Mich.

Filed Mar. 30, 1978, Ser. No. 891,553
Int. Cl.[2] A63B *69/40*
U.S. Cl. 273—26 E 11 Claims

1. An eye-hand coordinator assembly comprising; a standard, an arm having a support end and a ball end, a ball connected to said ball end by first connecting means, cam means connected by second connecting means to said support end of a ball-supporting arm and attached to said standard for allowing the arm and said ball to be displaceable from an initial position to various angular positions relative to the longitudinal axis of said standard in response to an impact to the ball, said cam means including an upper cam to which said arm is connected and a lower cam, said upper cam being movable for rotation and axial shifting from a rest position relative to said

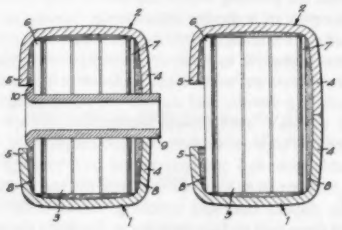


lower cam, biasing means positioned on the outside of said standard and interconnecting said upper cam and said lower cam for resisting said rotation and axial shifting of said upper cam relative to said lower cam and for urging said upper cam to said rest position thereby returning the arm to said initial position after an impact to the ball.

4,175,745
RACKET

Georges A. Gevers, Liége, and Philippe M. Jeghers, Esneux, both of Belgium, assignors to FN International Societe Anonyme, Luxembourg

Filed Jan. 31, 1978, Ser. No. 873,951
Claims priority, application Belgium, Jul. 8, 1977, 256066; Luxembourg, Jan. 12, 1978, 78855
Int. Cl.[2] A63B *49/02*
U.S. Cl. 273—73 C 3 Claims



1. A racket having a generally planar frame consisting of a loop for supporting stringing and a shaft integral with and extending from said loop, said frame comprising a pair of identical metallic members and a strip of honeycomb ribbon between said metallic members, said metallic members and honeycomb ribbon being adhesively secured together, said metallic members being at least partly of U-shaped cross section with their concave sides facing each other, said ribbon extending between said metallic members throughout said loop and the length of said shaft, wherein the U-shaped cross section of said metallic members comprises inner legs, on the inner periphery of said loop, being longer than the legs on the outer periphery of said loop, the ends of said outer legs being spaced apart.

4,175,746

GAME APPARATUS WITH FENCE-LIKE BOUNDARY DEFINING MEMBERS

Charles A. McRitchie, 49700 Cross St., Belleville, Mich. 48111

Filed Apr. 19, 1978, Ser. No. 897,817
Int. Cl.[2] A63B 67/04
U.S. Cl. 273—85 R 3 Claims

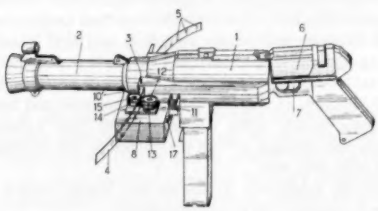
1. Game apparatus consisting of an elevated circular playing field divided into an offensive area and a defensive area, removable fence-like members defining the outer boundary of each area, and a removable backboard and basket assembly mounted at a point in the said defensive area, in which the fence-like member defining the outer boundary of the offensive area is higher than the member defining the outer boundary of the defensive area.

4,175,747

LIGHT PROJECTOR SHOOTING APPARATUS WITH MOVABLE, PERFORABLE, TARGET SUPPORT

Robert H. Hudson, Seekonk, Mass., assignor to Les Jouets Educatifs Universels, Drancy, France

Filed Aug. 29, 1977, Ser. No. 828,954
Claims priority, application France, Aug. 31, 1976, 76 26269
Int. Cl.[2] A63F 9/02; F41J 9/00
U.S. Cl. 273—101.2 1 Claim



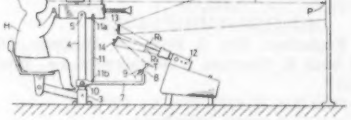
1. A shooting apparatus involving, in combination, a light projector having a source of light, an objective and a sighting device permitting placement in an interchangeable manner a perforable support carrying some targets through the light beam between the source of light and the objective in order to project the image of a target on a screen, and a member with hammer of a pistol type mounted in a movable manner with respect to the projector and driving by the means of said hammer a tapered element susceptible of perforating the support at a point somewhere on its surface: characterized in that the projector includes means for threading the perforable support bearing the targets to pass through said light beam continuously, the means for threading continuously the perforable support comprising a spring motor provided within a removable unit fixed on the exterior wall of the projector at the level of the sighting device, the motor being provided with a shaft extending through the wall of the unit and supporting at the free end thereof a driving pulley; a pressure pulley being susceptible to cooperate with the driving pulley in such a way that, during the functioning of the motor, the perforable support, previously inserted between the two pulleys, is driven continuously through the sighting device; the pressure pulley being carried by an axle provided on one of the extremities of a bent lever mounted within the unit in such a way as to be able to pivot between an active position in which it applies the pressure pulley against the driving pulley and an inactive position in which the pressure pulley is spaced from the driving pulley slightly, the lever being maintained in its active position under the influence of a leaf spring pushing on it in the neighborhood of the axle of the pressure pulley and being susceptible of being brought into its inactive position by pivoting said lever against the counter action exerted by the spring.

4,175,748

SHOOTING GAME DEVICE WITH PROJECTOR AND PHOTOELECTRIC DETECTOR

Gunpei Yokoi, Kyoto, Japan, assignor to Nintendo Co., Ltd., Kyoto, Japan

Filed Nov. 29, 1977, Ser. No. 855,607
Int. Cl.[2] F41G 3/26; F41J 5/02, 9/14
U.S. Cl. 273—101.2 4 Claims



1. A structure for a shooting game device of the type including a means for projecting moving targets and hits onto a screen and a gun having a gun sight and in which when the gun sight corresponds with the projected moving target a hit is projected onto said screen, said structure being characterized by:

a photoelectric element coupled to said gun such that it moves vertically and horizontally as the gun moves vertically and horizontally; and

a means for projecting a light mark in near proximity to said photoelectric element which is indicative of a position of a projected target on said screen, said means for projecting a light mark and said photoelectric element being arranged and configured such that when said light mark and said photoelectric element coincide, said photoelectric element generates a hit signal which causes a hit to be projected on said screen in lieu of said moving target, said means for projecting a light mark together with said means for projecting moving targets and hits comprising a projector having film disposed therein, each frame of said film being divided into a A track and a B track, said A track containing images for projecting said moving target in various stages of movement, said B track containing, at corresponding positions with said moving target, positioning signal marks for generating a light mark for acting upon said photoelectric element and images for projecting said moving targets in various stages of destruction and a first beam of light for displaying said moving target passing through said A track of said film and a second beam of light for displaying either a light mark or a hit scene passing through said B track whereby said moving target and said light mark or hit scene simultaneously projected from said projector.

4,175,749

ARROWHEAD BODY

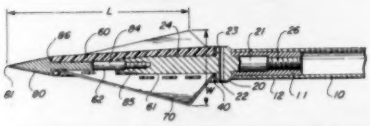
Miroslav A. Simo, Riverside, Ill., assignor to New Archery Products Corp., Riverside, Ill.

Continuation-in-part of Ser. No. 738,030, Nov. 2, 1976, Pat. No. 4,093,230, which is a continuation-in-part of Ser. No. 619,824, Oct. 6, 1975, Pat. No. 4,006,901. This application Nov. 21, 1977, Ser. No. 853,488

The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.

Int. Cl.[2] F41B 5/02

U.S. Cl. 273—106.5 B 17 Claims



1. An elongated arrowhead blade carrying body symmetrical about its long axis and having a through opening centered on its long axis, said opening adapted to receive a shaft portion of a nosepiece or adapter forming an assembled archery arrow having said blade carrying body between said nosepiece and arrow shaft, said blade carrying body having two to seven blades firmly mounted therein and extending further from the exterior of said body toward the arrow shaft and providing a streamlined shape.

4,175,750

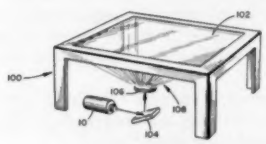
HOLOGRAPHIC PUZZLE

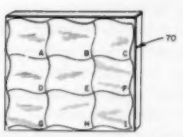
Norman M. Rugheimer, Rte. 2, Box 350, Bozeman, Mont. 59715, and Scott R. Chestnut, 5 Heatherwood La., Billings, Mont. 59102

Filed Jan. 9, 1978, Ser. No. 867,886

Int. Cl.[2] A63F 9/12

U.S. Cl. 273—157 R 16 Claims





1. Puzzle apparatus, intended to be assembled by at least one player, said puzzle apparatus comprising:

a plurality of individual segments formed of a developed hologram having thereon an interference pattern of a subject, each of said individual segments being of a size so that the unaided eye can discern a complete holographic image of said subject with no degradation;

a support surface; and

an illumination means associated with said support surface and arranged such that the angle of illumination is identical to the angle of the reference beam used to form said developed hologram, whereby the player arranges and orients said individual segments on said support surface so that upon illumination by said illumination means said subject is visually holographically reproduced to said player.

4,175,751

TOGGLE MECHANISM FOR VIDEO DISC PLAYER

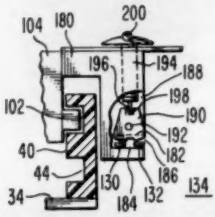
Larry D. Huff, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 29, 1978, Ser. No. 964,529

Claims priority, application United Kingdom, Feb. 13, 1978, 05729/78

Int. Cl.[2] G11B 17/06

U.S. Cl. 274—13 R 10 Claims



1. In a player for use with a disc record; said player including a turntable for centering and supporting said record; a mechanism for rotating said turntable; a pickup stylus for recovering prerecorded information from said record during playback; a carriage for supporting said pickup stylus; a mechanism for causing motion of said pickup stylus relative to said carriage between a depressed position, permitting stylus/record engagement, and an elevated position, precluding stylus/record engagement; a play belt for translating said carriage toward the center of said turntable at a speed correlated to the speed of rotation of said turntable; a search belt for translating said carriage toward and away from said turntable center at a speed independent of the speed of rotation of said turntable; apparatus comprising:

(A) a mechanical toggle switch;

(B) means for mounting said toggle switch to said carriage for motion between a first location, a second location and a third location; said toggle switch in said first location coupling said carriage to said play belt to the exclusion of said search belt; said toggle switch, when disposed in said second location, decoupling said carriage from said belts; said toggle switch, while occupying said third location, coupling said carriage to said search belt to the exclusion of said play belt; and

(C) means for selectively actuating said toggle switch to occupy a selected one of said locations.

4,175,752

TWO STAGE LABYRINTH PATTERN INCLUSION DEVICE

David C. Orlowski, Rock Island, Ill., assignor to Inpro, Inc., Rock Island, Ill.

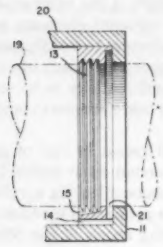
Filed Nov. 25, 1977, Ser. No. 854,827

Int. Cl.[2] F16J 15/44

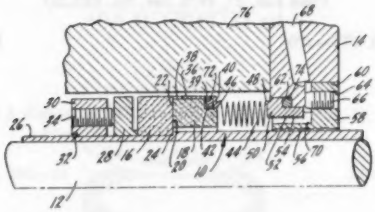
U.S. Cl. 277—53 5 Claims

1. A sealing ring comprising a ring member having a first axial face and a second opposite axial face, said second opposite axial face having an annular axially extending flange extending from the outer portion thereof, said ring member having an inner periphery having at least one annular groove, a first longitudinally extending groove in said inner periphery communicating between said at least one annular groove and

said first axial face but not with said second face, said ring member having an outer periphery, said outer periphery having a second longitudinally extending groove extending from said first face to said opposite axial face including said flange.



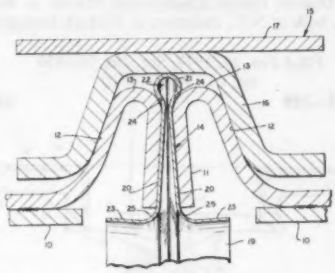
4,175,753
MECHANICAL SEAL
Robert S. Wentworth, Jr., Temecula, Calif., assignor to Borg-Warner Corporation, Chicago, Ill.
Division of Ser. No. 837,790, Sep. 29, 1977, Pat. No. 4,124,218.
This application Jun. 1, 1978, Ser. No. 911,632
Int. Cl.[2] F16J *15/10*
U.S. Cl. 277—87 **2 Claims**



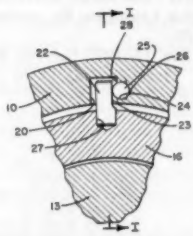
1. A mechanical seal comprising a stationary seal ring and a rotatable seal ring, said seal rings having engaging seal faces;
- a ferrule surrounding and in contact with the outer surface of one of said seal rings and having a depending flange;
- a substantially rectangular section, annular cavity defined by a groove in said one of said seal rings and a portion of said ferrule and its flange; and
- a gasket of fragile material characterized by poor elasticity and conformability in said cavity, said gasket having an initial cross-section of a parallelogram and being expanded radially and deformed to an ultimate cross section matching that of said cavity when assemblying said ferrule and said one of said seal rings.

4,175,754
SEAL FOR FLUID DUCTS
William E. Wilhelm, Marietta, Ga., assignor to Lockheed Corporation, Burbank, Calif.
Filed May 8, 1978, Ser. No. 903,931
Int. Cl.[2] F16L *51/04;* F16J *15/08*
U.S. Cl. 277—128 **3 Claims**

1. A seal to prevent the leakage of fluid from ducts connected end to end across flanges carried by the connected ducts, said seal being formed by a pair of sides having dimensions substantially equal to and in surface to surface abutment with the adjacent faces of said flanges throughout substantially the entire area thereof, said sides being interconnected at and along one edge by an integral wall disposed outwardly of said flanges and defining an internal chamber, said sides further terminating at and along their other edges in integral extensions laterally disposed in diverse directions.



4,175,755
MECHANICAL SEAL ASSEMBLY
Carl H. Geary, Greensburg, Pa., assignor to Carrier Corporation, Syracuse, N.Y.
Filed Dec. 11, 1978, Ser. No. 968,067
Int. Cl.[2] F16J *15/00, 15/34*
U.S. Cl. 277—137 **4 Claims**

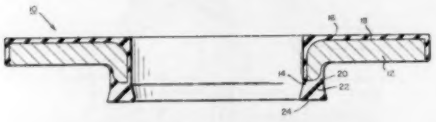


1. A shaft seal assembly for use in a rotary machine for preventing a process fluid from escaping about the shaft comprising:
- a stationary element having an opening to reveive a rotary shaft;
- a seal member mounted on the shaft within said stationary element in close running fit relation to the shaft for preventing the process fluid from escaping from a high pressure region to a region of relatively lower pressure;
- a locking pin affixed to said seal member and extending radially outwardly from said seal member into engagement with said stationary element for connecting said seal member to said stationary element for preventing rotation of said seal member;
- said stationary element being formed with a notch for receiving said locking pin, the fit between said notch and said pin permitting said seal member to move radially outward relative to said shaft; and
- bearing means affixed to the stationary element and being disposed normal to said locking pin for defining a roller bearing surface in contact with a radially extending surface of said pin for permitting the pin and seal member to freely move radially outward into said notch.

4,175,756
COMBINATION THRUST WASHER AND SEAL ARTICLE, APPARATUS

Dennis N. Denton, Gaston County, and Martin E. Benjamin, Gastonia, both of N.C., assignors to Garlock Inc., Longview, Tex.

Filed Feb. 14, 1977, Ser. No. 768,070
Int. Cl.[2] F16J 15/10
U.S. Cl. 277—189 32 Claims

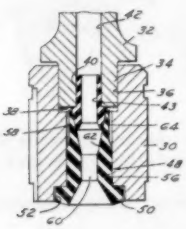


1. An article comprising a combination thrust washer and seal, said thrust washer and seal including a thrust washer and an annular seal body connected to said thrust washer, said thrust washer comprising a flat, solid, rigid, metal ring and a layer of material of said seal body substantially covering at least one radial side of said ring, said thrust washer having a pair of flat, continuous radial surfaces that are perpendicular to the axis of the thrust washer and that are adapted to carry an axial load, at least one of said radial surfaces being adapted to accommodate rotary motion between itself and an associated machine member in contact therewith, said seal body including an anchor portion connected to said washer and an axially extending sealing lip having a proximal end adjacent the I.D. of said washer and extending axially away from said washer and having a distal end adapted to sealingly contact at least one of an I.D. and an O.D. cylindrical surface.

4,175,757
SEALANT SYSTEM FOR ROOF DRILLING APPARATUS

Kenneth C. Emmerich, Lexington, Ky., assignor to Fansteel Inc., North Chicago, Ill.

Filed Jun. 15, 1977, Ser. No. 806,822
Int. Cl.[2] F16J 15/10
U.S. Cl. 277—212 F 2 Claims



1. A sealant system for a mining drill system which includes a series of drilling and driving elements releasably connected end to end in driving engagement and having central passages to carry coolant water to a drilling area to cool the drilling tip and flush chips and dust away from the drilling tip which comprises:

(a) an elongate hollow driving element to be driven by a rotating power source,

(b) a hollow drilling tip element to be driven by said driving element having a portion to be telescopically received in and driven by said driving element,

(c) one or more hollow, elongate intermediate driving elements each having an end to telescopically and drivingly engage with an end of a driving element and an end of a drilling tip element and selectively with additional intermediate driving elements,

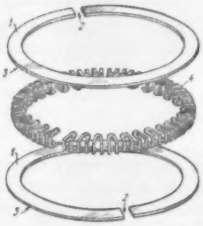
(d) a sealing insert to seal the joints between each of said adjacent elements formed as a resilient, deformable, tubular nipple having a central passage therethrough comprising a first portion on one end to be received and retained in an axial recess of one of said elements, and a second projecting portion at the other end to be received in another of said adjacent elements in telescoping relation with said one element to seal the internal passages formed by said telescoping elements, one of said portions being enlarged circumferentially to be received in an enlarged recess in one of said elements to position the insert longitudinally, and

(e) said enlarged recess in one of said adjacent elements comprising a second insert within the central bore of said one adjacent element having a cylindrical portion at one end lodged in a cylindrical recess in said adjacent element, and an enlarging recess at the other end to receive the projecting portion of the first insert.

4,175,758
TANGENTIAL EXPANDER FOR OIL CONTROL PISTON RINGS

Anatoly V. Adamovich, 2 ulitsa Mariinoi Roschi, 14a, kv. 35; Lev A. Burov, Kutuzovsky prospekt, 33, kv. 253; Rusaam S. Nemets, Sirenevy bulvar, 57, kv. 50; Efim S. Gorbulev, Tovarischesky pereulok, 9/11, kv. 5, all of Moscow; Boris S. Eremenko, Moskovsky prospekt, 96a, kv. 273, Kharkov; Felix A. Brainman, ploschad Vosstania, 1, kv. 1, Kharkov; Viktor P. Moldavanov, ulitsa Pionerskaya, 10, kv. 6, Odessa; Jury M. Kontsov, ulitsa Krasnova, 14, kv. 29, Odessa; Viktor F. Axenov, ulitsa Grekova, 4, kv. 277, Moscow, and Matvei I. Averbukh, ulitsa Pastera, 50, kv. 12, Odessa, all of U.S.S.R.

Filed Feb. 27, 1978, Ser. No. 882,203
Int. Cl.[2] F16F 1/34, 9/36
U.S. Cl. 277—220 1 Claim



1. A tangential expander for oil control piston rings in the form of a sinuous profiled spring bent into a split ring U-shaped in the cross section, formed by the side flanges bent off at the end in the form of thrust shoulders; a joint connecting the ends of said split ring and made in the form of the cut-off tooth-like portions of the U-shaped profile bent into the U-shaped profile to a distance equal to not less than the sum of the thickness of the initial material of the spring plus the height of the thrust shoulder so that each of said teeth is flexibly locked inside the U-shaped profile in the opposite end of the tangential expander.

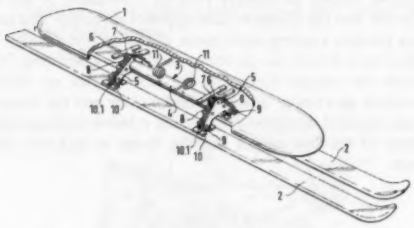
4,175,759
WINTER SPORT DEVICE

Harald Strunk, Dilsbach-Str. 21, 6107 Reinheim 3, Fed. Rep. of Germany

Filed Feb. 21, 1978, Ser. No. 879,486
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1977, 2707364
Int. Cl.[2] B26B 13/00
U.S. Cl. 280—16 9 Claims

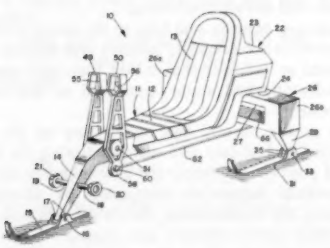
1. A winter sport device, comprising a pair of elongated parallel skids; a user support above said skids; and means mounting said support on said skids for converting a tilting

movement of said support about a first axis parallel to the elongation of said skids into a corresponding tilting movement of said skids about respective second axes paralleling said first axis, said means including two bridge-shaped supports longitudinally spaced from each other, each end of each of said bridge-shaped supports being fixed on one of said skids, two carriers each fixedly connected to said user support and each mounted on one of said two bridge-shaped supports, a member



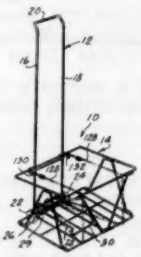
mounted on said bridge-shaped support for tilting said skids, said member being rigidly connected at one side to said carriers and at the other side to each of said skids so as to keep said skids parallel to said user support during their corresponding tilting movement, and a chain drive including an endless chain operatively connected with a driving chain wheel rigidly connected to said carriers, and two driven chain wheels each of which is rigidly connected to one of said skids.

4,175,760
SKI-SLED
Thomas A. Gustafson, 6266 Halverson Dr., Rockford, Ill. 61109
Filed Nov. 7, 1977, Ser. No. 849,220
Int. Cl.[2] B62B *13/14*
U.S. Cl. 280—16 **12 Claims**



1. A ski sled, comprising: a body having a forward end and a rearward end, and having means defining a generally horizontal seating surface between the forward and rearward ends thereof, adjacent the rearward end; at least one forward ski carried by the forward end of the body; steering means at the rear end of the sled, including a transversely extending steering beam pivotally connected about a vertical axis to the rearward end of the body, and having opposite, outer ends projecting outwardly beyond the opposite sides of the body; a rear ski carried by the steering beam at each of the outer ends thereof, giving lateral stability to the sled; and a pair of steering arms pivoted to the body and having connecting links connected to the steering beam on opposite sides of the body to pivot the steering beam about the vertical axis and effect turning of the sled, the rear placement of the seating surface and steering means resulting in more effective steering action.

4,175,761
COMBINATION LUGGAGE CARRIER AND CART
Thomas B. Marshall, 346 Drovers La., Palatine, Ill. 60067
Filed Nov. 4, 1977, Ser. No. 848,708
Int. Cl.[2] B62B *1/12*
U.S. Cl. 280—47.18 **16 Claims**

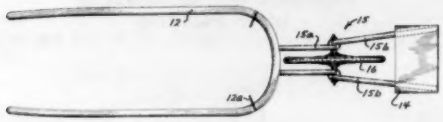


1. A collapsible basket for a hand truck type wheeled carrier, comprising:
- a generally flat open, rectangular upper frame including a pair of first sides and a pair of second sides;
- a generally flat, closed, bottom frame forming the bottom of the basket and including a pair of first sides and a pair of second sides;
- said means pivotally connected to at least one of said frames and releasably connectible to the other of said frames and extending from said first sides of said upper frame to said first sides of said bottom frame and from at least one of said second sides of said upper frame to the corresponding side of said bottom frame to form sides for the basket; and
- connecting means for connecting said basket to the carrier,
- said upper frame including a wire bent to form said first and second sides,
- said bottom frame including a plurality of wires and a peripheral wire connected to said plurality of wires and defining said first and second sides, and
- said side means including pivotally-mounted wires,
- each of said pivotally-mounted wires including a resilient generally V-shaped structure with a first portion oblique to the legs of the V at the intersection of the legs giving a flattened V appearance, and second portions at the distal ends of the legs of the V extending parallel to said first portion,
- the respective frame including a first tube about said first wire portion forming the pivot therefor, and
- the respective other frame including, for each V-shaped wire structure, a pair of second tubes, spaced apart less than the spacing of, and for receiving said second portions so that the V-shaped structures must be flexed to move the legs toward each other to permit engagement of said second portions and said second tubes under the bias of the resiliency of the wire structure.

4,175,762
SULKY
Damon A. Vaughn, 525 N. Main St., and Herbert F. Hoffman, 336 S. Main St., both of Henderson, Ky. 42420
Filed Jan. 23, 1978, Ser. No. 871,196
Int. Cl.[2] B62C *1/08*
U.S. Cl. 280—78 **5 Claims**

1. A sulky comprising a frame adapted to receive and partly surround an animal, a single wheel supporting said frame, and a seat for the driver of the sulky disposed on said frame and positioned behind said single wheel in a direction opposite to the path of movement of the sulky, where said frame and said

driver's seat are integral and vertically adjustable with respect to said single wheel through supporting structure which ex-



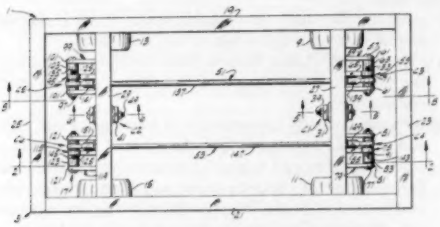
tends downwardly and is received in hollow cylinders on which said single wheel is rotatably positioned.

4,175,763

SUSPENSION SYSTEM FOR LAND VEHICLES

William R. Conner, Jr., Shelbyville, Tenn., assignor to Kellwood Company, St. Louis, Mo.

Filed Jul. 28, 1978, Ser. No. 928,736
Int. Cl.[2] B60P *1/00*
U.S. Cl. 280—104 **33 Claims**



1. A vehicle comprising a frame, first and second wheel carriers spaced longitudinally of the frame, wheels carried by the wheel carriers at opposite sides of the vehicle, and a suspension system for supporting the frame on the wheel carriers, said suspension system comprising:

a first connection between the frame and the first carrier generally centrally of the first carrier, said first connection transferring part of the weight of the frame to the first carrier and allowing the frame and the first carrier to rock relative to one another about an axis extending generally longitudinally of the vehicle;

a second connection between the frame and the second carrier generally centrally of the second carrier, said second connection transferring part of the weight of the frame to the second carrier and allowing the frame and the second carrier to rock relative to one another about an axis extending generally longitudinally of the vehicle;

a third connection between the frame and the first carrier on one side of the first connection for transmitting force from the first carrier to the frame on said one side of the first connection; a fourth connection between the frame and the first carrier on the other side of the first connection for transmitting force from the first carrier to the frame on said other side of the first carrier;

said third and fourth connections permitting the relative rocking movement of the frame and the first carrier;

a fifth connection between the frame and the second carrier on one side of the second connection for transmitting force from the second carrier to the frame on said one side of the second connection;

a sixth connection between the frame and the second carrier on the other side of the second connection for transmitting force from the second carrier to the frame on said other side of the second connection;

said fifth and sixth connections permitting the relative rocking movement of the frame and the second carrier;

first means interconnecting said third and fifth connections for transmitting force from the first carrier to the second carrier on relative rocking movement of the first carrier and the frame in one direction and causing relative rocking movement of the second carrier and the frame in the opposite direction, and for transmitting force from the second carrier to the first carrier on relative rocking movement of the second carrier and the frame in said one direction and causing relative rocking movement of the first carrier and the frame in the opposite direction; and

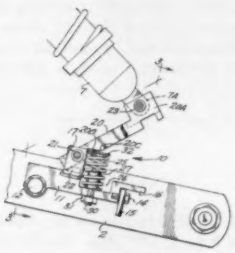
second means interconnecting said fourth and sixth connections for transmitting force from the first carrier to the second carrier on relative rocking movement of the first carrier and the frame in said opposite direction and causing relative rocking movement of the second carrier and the frame in said one direction, and for transmitting force from the second carrier to the first carrier on relative rocking movement of the second carrier and the frame in said opposite direction and causing relative rocking movement of the first carrier and the frame in said one direction.

4,175,764

MOTORCYCLE WHEEL SUSPENSION DEVICE

Roger P. Johnson, 2977 Coker Butte Rd., Medford, Oreg. 97501

Filed Apr. 6, 1978, Ser. No. 893,959
Int. Cl.[2] B62K *25/20*
U.S. Cl. 280—284 **6 Claims**



1. A wheel suspension device for a motorcycle swing arm to receive the lower end of an extensible motorcycle suspension component, said device comprising,

a base, means securing said base to the swing arm,

an upwardly and rearwardly inclined arm member pivotally mounted at its lower end to said base, said arm member pivotally attached at its upper end to said suspension component,

resilient means on said base and acting on the pivotally mounted end of said arm member urging the latter to a raised position relative to the base whereby the attached motorcycle suspension component is advantageously disposed for repositioning the swing arm and returning the wheel carried thereby into ground contact after momentary separation from the ground, and

the pivotally mounted end of said arm member and said base having opposed surfaces against which said resilient means acts.

4,175,765

PARALLEL HITCH FOR A BELLY MOUNTED TRACTOR APPLIANCE

George W. Murphy, Hopewell, Ohio, assignor to Dura Corporation, Southfield, Mich.

Filed May 15, 1978, Ser. No. 905,779
Int. Cl.[2] A01D *35/12*
U.S. Cl. 280—460 A **7 Claims**

1. In combination with a tractor,

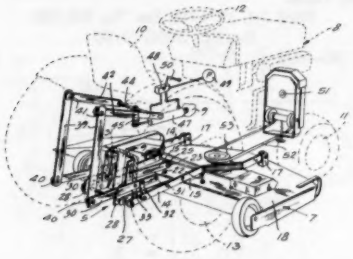
a belly mounted appliance having an upper flat plane horizontal deck with upstanding clevis-like anchor post means at one end in which is supported pivot pin means and

upstanding journal post means at its opposite end and having horizontal journal head means supported thereby,

an axle rod fixed on the tractor and disposed in spaced relation to said appliance,

first lever arm means pivotally connected to said axle rod and having a lost motion connection to said clevis-like anchor post means at said pivot pin means,

second lever arm means shorter than said first lever arm means and pivotally connected to said axle rod and having a bearing slot engaging said journal post means at said journal head means,



and power operated actuation means for lifting said first and second lever arm means comprising a leverage system connected to said tractor and having a third lever arm means pivotally connected to a fixed point on the tractor above said first and second lever arm means between said axle rod and said journal post means,

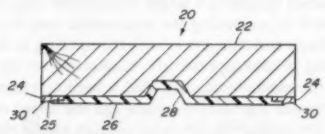
and first and second link means between said third lever arm means and said first and second lever arm means, respectively,

whereby operation of the actuation means will actuate said leverage system and through said link means will lift the appliance while keeping said horizontal deck generally level.

4,175,766
SKI EDGE

Raymond K. Barwin, 14463 Twelve Mile Rd., Apt. D, Warren, Mich. 48093

Filed Jun. 23, 1978, Ser. No. 918,345
Int. Cl.² A63C *5/04*
U.S. Cl. 280—608 **6 Claims**



1. A ski for skiiing on snow having an edge member attached to the outer edges of the bottom of said ski, said edge member comprising:

a hidden edge;

a plastic surface attached to the bottom partially covering and retaining the hidden edge;

a plurality of separate and partial undercuts employed along the length of said edge member each undercut forming together with the outer wall of the edge member a lip having an included angle of less than **90** degrees between the outer wall and the bottom surface of the edge member;

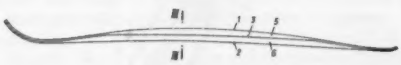
said undercuts extending from the lip to the edge of the plastic surface and increasing a surface area of said edge member contacting the snow thereby increasing the bite of the ski when turning on hard snow or ice; and

said undercuts omitted at a lip and tail portion of said member.

4,175,767
SKI STRUCTURES

Franz Scheruebl, Schwemmberg 117, Radstadt, (Salzburg), Austria

Filed Dec. 9, 1977, Ser. No. 859,043
Claims priority, application Austria, Dec. 10, 1976, 9131/76
Int. Cl.² A63C *5/12*
U.S. Cl. 280—610 **4 Claims**



4. A ski structure comprising, in combination:

(a) a top chord,

(b) a bottom chord,

(c) core means disposed between said top and bottom chords and varying in height lengthwise of the ski structure,

(d) at least one intermediate chord dividing said core means longitudinally of the ski structure,

(e) the ski structure being shaped to have a toe portion, a middle portion and a heel portion,

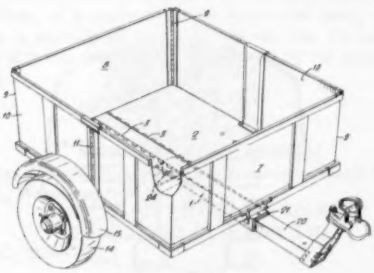
(f) and at least one intermediate chord disposed closely adjacent and following said top chord at said toe and heel portions and with said chord being spaced by a substantially constant distance from said bottom chord in said middle portion,

(g) said intermediate chord being disposed at a distance from said top chord which progressively diminishes towards said toe and heel portions.

4,175,768
COLLAPSIBLE TRAILERS

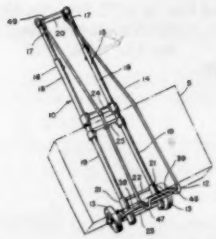
Ronald A. Thackray, Great Baddow, England, assignor to Stow-A-Way Trailers Limited, Essex, England

Filed Feb. 21, 1978, Ser. No. 879,603
Claims priority, application United Kingdom, Feb. 23, 1977, 7655/77
Int. Cl.² B62B *11/00*
U.S. Cl. 280—652 **5 Claims**



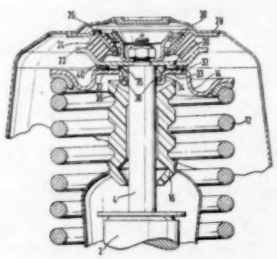
1. In a collapsible road trailer comprising a central main beam, a base comprising separate side members and means hingeing said side members to said main beam, a collapsible wall structure, means for removably securing said wall structure to said base, two wheel assemblies and means for removalby securing said wheel assemblies to said base, the improvement comprising said main beam being hollow, a tow bar telescoped within said main beam and means locking said tow bar at a predetermined position within said main beam, said locking means being operated by the hingeing down of said side members of said base.

4,175,769
PORTABLE LUGGAGE CARRIER
Eugene A. Kazmark, 5 Remin La., Joliet, Ill. 60433
Filed May 1, 1978, Ser. No. 901,571
Int. Cl.[2] B62B *11/00*
U.S. Cl. 280—654 7 Claims



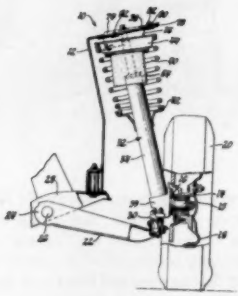
1. A portable luggage carrier comprising an elongated frame having upper and lower ends, a base for supporting luggage having a pair of spaced-apart rods pivotally mounted on the frame adjacent the lower ends thereof and movable between a storage position in which the rods extend generally parallel to the frame and a luggage-supporting position in which the rods extend perpendicularly to the frame, said frame including a pair of spaced-apart frame members and a detent bracket mounted on each of said frame members, an axle extending through said detent brackets, and a pair of wheels mounted on said axle, each of said detent brackets including a projection for releasably holding one of the rods in its luggage-supporting position, each projection having camming surfaces which are engageable with one of the rods whereby the projection can be cammed away from the rod to permit the rod to move to and from its luggage-supporting position.

4,175,770
MOTOR VEHICLE SUSPENSION STRUTS
Adolf Draisbach, Kelsterbach, and Kurt H. Fiedler, Geinsheim, both of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.
Filed Dec. 19, 1977, Ser. No. 861,860
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1976, 2658835
Int. Cl.[2] B60G *11/14*
U.S. Cl. 280—668 6 Claims



1. A suspension strut for a motor vehicle, comprising a telescopic damper having a housing forming a support for a steering knuckle, a piston rod projecting from the housing, support bracket means secured to the damper housing, a spring support plate surrounding the piston rod, a helical suspension spring having opposite ends thereof seated on the support bracket means and on the spring support plate respectively, a support flange secured to the piston rod, resilient mounting means connected to the support flange to form a resilient mounting permitting limited piston rod movement relative to a body portion of the vehicle, a rolling bearing interposed between the spring support plate and the piston rod support flange, and a friction element of resilient plastic material in parallel relationship with said bearing operatively disposed between the spring support plate and the piston rod support flange and in direct frictional engagement therewith to provide a predetermined amount of bearing friction therebetween.

4,175,771
RESILIENT MOUNTING MEANS FOR MACPHERSON STRUT
Richard A. Muzechuk, Kettering, Ohio, and Marvin J. Hyma, Pontiac, Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Jul. 27, 1978, Ser. No. 928,508
Int. Cl.[2] B60G *15/00*
U.S. Cl. 280—696 3 Claims



1. In a vehicle suspension system including sprung and unsprung masses, a shock absorber operatively connected between the sprung and unsprung masses, the shock absorber outer casing being operatively connected at its lower end to the unsprung mass and having a piston rod extending exteriorly of its upper end and flexibly connected to the sprung mass adjacent an opening formed in the sprung mass, and a coil spring mounted around the shock absorber and being operatively connected at its lower end to a retainer flange formed on the outer casing and having its upper end flexibly connected to the sprung mass, the improvement comprising a dual-rate elastomeric mounting means adapted to being secured to the sprung mass and operatively connected to the piston rod and the upper end of the coil spring, the dual-rate elastomeric mounting means including a single elastomeric ring, mounting means adapted to preloading the elastomeric ring between the mounting means and concentric with the opening in the sprung mass, bearing means operatively connected to the bottom portion of the elastomeric ring, and a spring retainer flange mounted between the bearing means and the upper end of the coil spring for subjecting the outer portion of the elastomeric ring to compression forces during jounce and rebound conditions, and the piston rod being operatively connected to the center portion of the elastomeric ring for subjecting the center portion thereof to shear forces during such jounce and rebound conditions, thereby providing predetermined different stiffness characteristics for the shock absorber and the coil spring.

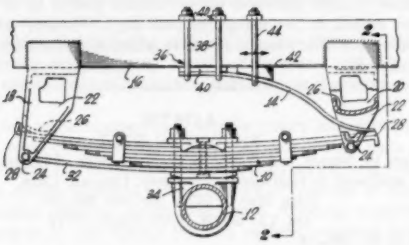
4,175,772
VEHICLE SUSPENSION SYSTEM HAVING AUXILIARY SPRING FOR LIGHTLY LOADED CONDITIONS
Albert J. Lampert, San Clemente, Calif., assignor to Cambria Spring Company, Los Angeles, Calif.
Filed Apr. 1, 1977, Ser. No. 783,661
Int. Cl.[2] B60G *11/04*
U.S. Cl. 280—718 8 Claims

1. A suspension system for a vehicle comprising:

a main leaf spring connected to at least one axle of said vehicle;

hanger means attached to the frame of said vehicle for retaining said mainspring while permitting vertical travel thereof within a predetermined range;

an auxiliary spring attached to said frame and disposed between said frame and said mainspring, said auxiliary spring extending continuously along said frame toward said hanger means from the point of attachment thereof to said frame and downwardly biasing said mainspring toward the lower limit of said range of travel, said auxiliary having a portion adjacent said point of attachment that is substantially parallel with said frame and a portion



of said auxiliary spring located between said point of attachment and said hanger having a slight S-curvature, said auxiliary spring having a spring rate substantially lower than that of said mainspring, whereby said vehicle rides on said auxiliary spring when lightly loaded but rides on said mainspring when heavily loaded; and

a wedging member attached to said frame and engaged by said auxiliary spring, for flexing of said spring thereat in both vertical directions said wedging member being disposed between said hanger means and the point of attachment of said auxiliary spring to said frame, the force exerted on said mainspring by said auxiliary spring being dependent on the position of said wedging member.

4,175,773

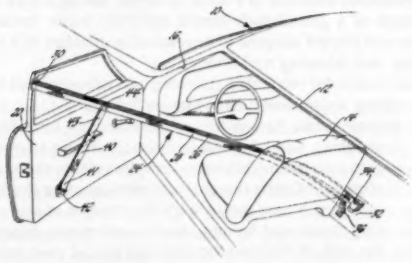
PASSIVE SEAT BELT SYSTEM

Larry D. Miller, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 10, 1978, Ser. No. 922,998

Int. Cl.[2] B60R *21/10*

U.S. Cl. 280—803 **3 Claims**



1. In combination with a vehicle body defining an occupant compartment in which an occupant seat is accessible through a door opening selectively opened and closed by a movable door, a passive occupant restraining belt arrangement comprising:

a shoulder belt having first and second ends;

a shoulder belt anchor mounted on the door generally adjacent the shoulder of the occupant and slidably receiving the shoulder belt intermediate the first and second ends thereof;

means attaching the first end of the shoulder belt inboard the occupant and generally adjacent the occupant hip;

retracting means mounted on the vehicle body inboard and generally adjacent the hip of the occupant and having the second end of the shoulder belt attached thereto for extending the second end of the shoulder belt upon outward opening movement of the door and sliding movement of the shoulder belt through the door mounted shoulder belt anchor;

a lap belt having first and second ends;

means attaching the first end of the lap belt on the vehicle door generally adjacent the hip of the occupant;

and means attaching the second end of the lap belt to the shoulder belt at a point thereon traveling from inboard the occupant adjacent the hip when the door is closed to a position intermediate the retracting means and the door mounted anchor loop upon opening movement of the door whereby the lap belt is moved from the normal door closed restraining position to a nonrestraining position when the door is open.

4,175,774

NON-COPYING PRINTED DOCUMENT AND METHOD OF PRINTING SAME

Gerald A. Tonges, Sycamore Township, Hamilton County, and Eugene L. Elmlinger, Springdale, both of Ohio, assignors to American Standard Inc., Cincinnati, Ohio

Filed Mar. 23, 1978, Ser. No. 889,229

Int. Cl.[2] B42D *15/00*

U.S. Cl. 283—6 **3 Claims**

1. A document including a sheet and a background printed on the sheet, the background including a first portion formed of small dots and a second portion formed of larger dots, the dots being of a single color, the larger dots being of a size which is reproduced by a copying machine, the small dots being of a size which is not reproduced by the copying machine.

4,175,775

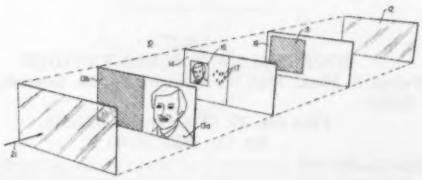
ACCESS CONTROL SYSTEM

Herman Kruegle, Rivervale, N.J., assignor to Visual Methods, Inc., Westwood, N.J.

Filed Jan. 11, 1978, Ser. No. 868,522

Int. Cl.[2] G02B *27/14*; G09F *3/02*

U.S. Cl. 283—7 **7 Claims**



1. An improved identification card of the type that includes

a first region bearing visible indicia descriptive of the authorized holder of the card, wherein the improvement comprises:

a second region of said card bearing further visible indicia descriptive of said holder, said further visible indicia being recorded on a photographic transparency; and

means for inhibiting detection of said further visible indicia when said card is illuminated by visible radiation of normal intensity and wavelength, said inhibiting means comprising:

a reflecting medium downstream of said photographic transparency; and

an optical filter upstream of said photographic transparency.

4,175,776

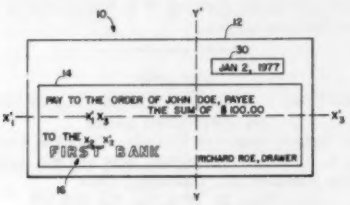
COUNTERFEIT RESISTANT DOCUMENT

Carmine J. Ranauro, Arlington, Mass., assignor to New England Mutual Life Insurance Company, Boston, Mass.

Filed Jan. 5, 1978, Ser. No. 867,117

Int. Cl.[2] B42D *15/00*

U.S. Cl. 283—8 B **6 Claims**



1. A counterfeit resistant document having a set of indicia on a background field wherein said set of indicia and said background field are characterized by different optical absorption spectra with respect to incident light having wavelengths within the response spectrum of the human eye, and are substantially non-absorbing with respect to incident light having wavelengths within the response spectrum of a color xerographic copier, said document comprising:

a substrate underlying said set of indicia and said background field, and having a surface which is substantially non-absorbing with respect to incident light having wavelengths within the response spectrum of a color xerographic copier,

at least two types of ink particles deposited on said substrate surface over said background field with different non-uniform distributions,

said ink particle distributions defining said set of indicia with at least one of said distributions providing substantially no ink particles overlying said substrate surface within the contours of said set of indicia and providing a plurality of ink particles on said substrate surface adjacent to and exterior to the contours of said set of indicia,

wherein said ink particles of each of said types are characterized by optical absorption spectra different from each other and from said substrate surface with respect to incident light having wavelengths within the response spectrum of the human eye, and wherein the particles of said one distribution are substantially non-absorbing with respect to incident light having wavelengths within the response spectrum of a color xerographic copier.

4,175,777

BOOK INDEX AND SUBJECT FINDER

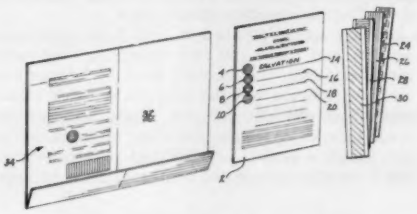
Sherrye J. Horn, 5747 W. Missouri, Sp. 89, Glendale, Ariz. 85301

Filed Jun. 29, 1978, Ser. No. 920,575

Int. Cl.[2] B42F *21/00*

U.S. Cl. 283—42 **4 Claims**

1. A book index comprising an index page adapted for permanent attachment to the body of a page of the book; color indicia carried by said page; subject identification means associated with said color indicia; separate subject markers comprising transparent colored sheets keyed to the colors of said color indicia and adapted to self-adhere to the pages of said



book to cover pertinent subject matter desired to be marked and extend to the margin of said page, whereby said color indicia is visible when the book to which said sheets are applied is closed.

4,175,778

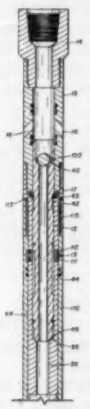
RELEASING TOOL

Carl W. Nunez, and Joseph S. Squyres, both of Lafayette, La., assignors to Halliburton Company, Duncan, Okla.

Filed May 1, 1978, Ser. No. 901,397

Int. Cl.[2] E21B *23/00;* **F16L** *37/14*

U.S. Cl. 285—3 **1 Claim**



1. A releasing tool having one end thereof being adapted to be releasably attached to a hook-up nipple having a bore therethrough of a gravel pack screen assembly while having the other end thereof adapted to be releasably attached to a tubing string, said releasing tool comprising:

case means for releasably attaching said releasing tool to said tubing string, said case means including:

adapter means having a bore therethrough for releasably attaching said releasing tool to said tubing string;

ported case means having a bore therethrough, having a plurality of ports therein for communicating the bore of said ported case means with the exterior of said ported case means and having annular seal means disposed in the wall of the bore through said ported case means on opposite sides of said ports; and

releasing body means having a bore therethrough and a plurality of apertures therein;

releasing block means retained within the apertures in said releasing body means of said case means for releasably attaching said releasing tool to said hook-up nipple of said gravel pack screen assembly;

releasing mandrel means slidably disposed within said case means for alternately allowing said releasing block means

to engage and disengage an annual channel in said hook-up nipple of said gravel pack screen assembly when said releasing mandrel means is moved from a first position in said case means maintaining said releasing block means engaging said hook-up nipple to a second position in said case means allowing said releasing block means to disengage said hook-up nipple, said releasing mandrel means including:

a cylindrical member slidably disposed within said case means, said cylindrical member having a bore therethrough, a first annular channel in the exterior surface thereof, and a second annular channel in the exterior surface thereof for receiving said releasing block means therein when said releasing mandrel means is in said second position allowing said releasing block means to disengage said hook-up nipple;

shear pin means securing said ported case means to said releasing mandrel means thereby maintaining said releasing mandrel means in said first position in said case means; and

snap ring means retained in an annular cavity formed when a portion of one end of said ported case means abuts a portion of one end of said releasing body means, said snap ring means engaging the first annular channel in said releasing mandrel means when said releasing mandrel means is in said second position thereby retaining said releasing mandrel means in said second position.

4,175,779

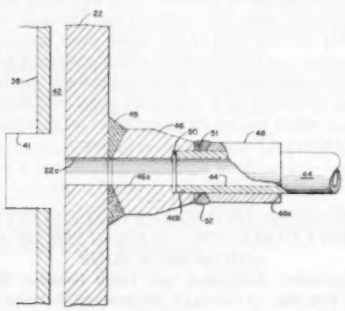
STRESS CONTROL COLLAR

William R. Apblett, Jr., Florham Park, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Jan. 18, 1978, Ser. No. 870,393

Int. Cl.[2] F16L *13/04, 5/02;* **B01J** *8/06*

U.S. Cl. 2o5—115 **4 Claims**



1. A welded interconnection for connecting a cylindrical member in registry with an opening extending through a second member, said members being subjected to thermally induced relative bending therebetween, said interconnection comprising a tubular extension connected at one end to said second member and defining a through bore in registry with said opening, said tubular extension having a counterbore at its other end for receiving an end portion of said cylindrical member, a first weld connecting said other end of said tubular extension to an outer surface portion of said cylindrical member, a collar for displacing from the region of said weld the mechanical stress caused by said bending, said collar extending over a portion of said cylindrical member with the inner end of said collar located proximate to said first weld, and a second weld connecting said inner end of said collar with said first weld and said cylindrical member, said collar being fabricated from the same material as said cylindrical member.

4,175,780

LATCH MECHANISM

Uldéric S. Hill, C.P. 68 Co. Stanstead, Rock Island, Quebec, Canada

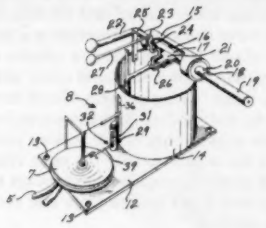
Division of Ser. No. 680,965, Apr. 27, 1976, Pat. No. 4,084,519.

This application Oct. 5, 1977, Ser. No. 839,733

Claims priority, application Canada, May 2, 1977, 277375

Int. Cl.[2] E05C *3/02*

U.S. Cl. 292—201 **8 Claims**



1. A latch mechanism comprising a support, a latch finger including a root portion and a latch pin portion freely pivotable at one end to one end of said root portion about a transverse axis relative to the longitudinal axis of said root portion, said root portion maintained horizontal by said support and rotatable therein about said longitudinal axis between a latching position in which said transverse axis is upright and said latch pin portion is maintained horizontal and in alignment with said root portion, and a releasing position in which said transverse axis is horizontal and said latch pin is allowed to freely pivot about said transverse axis to a downwardly hanging position, biasing means acting on said root portion to urge rotation of the latter in said support from said latching position to said releasing position, a catch device releasably holding said root portion in said latching position against the action of said biasing means and a trigger device selectively operating said catch device to cause the latter to release said root portion permitting rotation of the latter from said latching position to said releasing position under the action of said biasing means.

4,175,781

LATCHING ARRANGEMENT FOR MANHOLE COVER

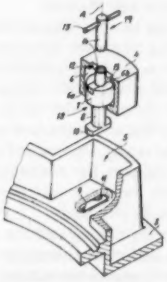
Robert Dumortier, 9 rue Duchartre, Béziers (Hérault), France

Filed Jan. 3, 1978, Ser. No. 866,708

Claims priority, application France, Jan. 5, 1977, 77 00650; Nov. 25, 1977, 77 36458

Int. Cl.[2] E05C *3/10*

U.S. Cl. 292—218 **9 Claims**



1. A latching arrangement for a manhole, said arrangement comprising:

a disk-shaped manhole cover formed with a cavity and upper and lower throughgoing apertures opening into said

cavity and both lying on a cavity axis along the periphery of the cover;

a latching member rotatable in said cavity about said axis and having a lower end projecting through said lower aperture and an upper end underneath said upper aperture and formed at said axis with a socket opening toward said upper aperture, said socket and said upper aperture being of similar shape and having like radial extensions;

a ring-shaped support having a seat snugly engageable with said cover and including means having a formation cooperating with said lower end of said latching member for locking said cover and support together in a locking angular position of said latching member relative to said axis and for permitting separation of said cover and support in an angularly offset freeing position of said latching member relative to said support, said extensions being axially and angularly aligned only in said locking position; and

a key having a tip of substantially the same cross-sectional shape as said upper aperture and said socket and engageable through said upper aperture into said socket only in said locking position.

4,175,782

DEVICE FOR CLOSING BAGS

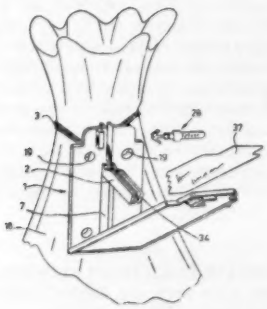
Eduardo de Lima Castro Neto, Rua São Luiz Gonzaga 912, 20.000 Rio de Janeiro - RJ, Brazil

Filed Mar. 9, 1978, Ser. No. 885,043

Claims priority, application Brazil, Oct. 20, 1977, 7707028

Int. Cl.[2] B05D *33/34*

U.S. Cl. 292—307 R **8 Claims**



1. A device for closing bags comprising:

(a) a lever provided with means for fixing one end of a string or the like to at least one point along its length and a guide for the string or the like at a fixed point on the lever which is spaced from a first end thereof;

(b) an element defining an open topped elongated cavity for the lever and having means for fixing the other end of the string or the like to at least one point thereof, said element being provided with string guide means disposed substantially axially with respect to the cavity and a support in said cavity for said first end of the lever so that, on placing the lever within the cavity, the contact point between said first end and the support lies between the guide on the lever and the guide means on said element, defining approximately a straight line; and

(c) a closure member for closing said top of the cavity with the lever therein, said closure member and said element being provided with means permitting their immobilization with respect to each other by the application of a security seal, said string fixing means on at least one of said element and lever defining a plurality of fixing points to permit the adjustment of the length of the string or the like.

4,175,783

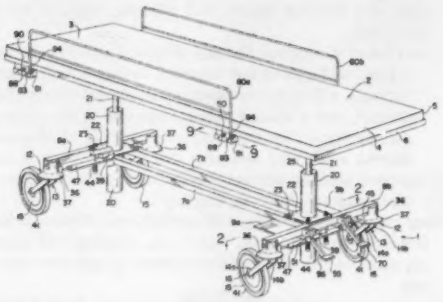
STRETCHER

Michael J. Pioth, 5900 Center Rd., Valley City, Ohio 44280

Filed Feb. 6, 1978, Ser. No. 875,674

Int. Cl.[2] A61G *3/00*

U.S. Cl. 296—20 **1 Claim**



1. In a stretcher suitable for supporting and transporting patients in hospitals and the like comprising a chassis and a bed portion overlying said chassis and carried by said chassis, said chassis having (1) a frame comprising two laterally spaced longitudinal members of rectangular cross-section running longitudinally and horizontally the substantial length of the stretcher and horizontal cross members also of rectangular cross section one of which is welded perpendicular to and at each end of said longitudinal members, said cross members extending equidistantly beyond the two longitudinal members, and (2) a castor wheel assembly rotatably carried in a swivel frame, carried at each end of each cross member, and (3) brake means which comprises four inverted cup-like brake shoes, one to bear against each wheel, each of said brake shoes having a cylindrical portion concentric with the axis of swivel of one said castor wheels and a flared perpheral lip that overlies a tire, suitable spring means to normally hold said brake shoes in an upward position away from said tire, and hydraulic means for controllably moving each of said brake shoes toward the tire that it overlies, the improvement which comprises an annular downwardly extending portion that is the outer annular terminus of said perpheral lip of said brake shoes, said downwardly extending portion having a radius that is no greater than the radius of swivel of the center of said wheels.

4,175,784

DEVICE FOR MOUNTING THE GUIDE SLEEVE OF A DRIVE CABLE FOR A SLIDING TOP OF AN AUTOMOBILE ROOF

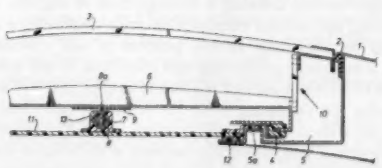
Walter Schätzler, Aufhausen, and Erich Handler, Starnberg, both of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Fed. Rep. of Germany

Filed Jul. 12, 1978, Ser. No. 924,003

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1977, 2731408

Int. Cl.[2] B60J *7/10*

U.S. Cl. 296—137 E **24 Claims**



1. Device for mounting the guide sleeve of a pressure-resistant drive cable for a sliding top of an automobile roof of the

type wherein the sliding top is covered toward the inside of the automobile by a displaceable headliner, wherein the guide sleeve has a longitudinal slot, and the drive cable is attached, by means of a retaining device penetrating the longitudinal slot, to a transport bridge connected to the sliding top, characterized in that a guide support means is attached to the sliding headliner, this guide support means supporting the guide sleeve at least in a pushed-back open position of the sliding headliner.

4,175,785

MOTOR VEHICLE ROOF

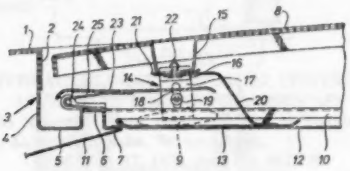
Robert Leiter, Krailling, Fed. Rep. of Germany, assignor to Webasto-Werk W. Baier GmbH & Co., Fed. Rep. of Germany

Filed Aug. 2, 1977, Ser. No. 821,236

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1976, 2637839

Int. Cl.² B60J *7/04*

U.S. Cl. 296—137 E **14 Claims**



1. Movable vehicle panel apparatus including a vehicle panel which is movable to and from a closed position closing an opening in a vehicle body portion defining a passenger space, said panel comprising:

a cover part which faces away from the interior of the vehicle passenger space when said panel member is in said closed position,

a headlining spaced from said cover part and disposed to face the interior of the vehicle passenger space when said panel member is in said closed position,

and resilient leaf spring means attached to and between the cover part and headlining for interconnecting said cover part and said headlining in such a manner as to resiliently movably support said headlining means with respect to said cover part, and so as to resiliently push said headliner against a surrounding relatively fixed vehicle frame part when said panel member is in said closed position, the attachment of said leaf spring means to the cover part being forward of its attachment to the headlining in the closing direction of movement.

4,175,786

DEVICE FOR TRANSPORTING CHILDREN ON CHAIR LIFT SEATS

Herta Schaller, and Herbert Schaller, both of Gusshausstrasse 6, Vienna, Austria (A-1040)

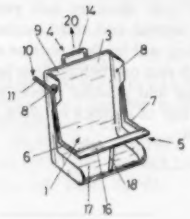
Filed Nov. 8, 1977, Ser. No. 849,626

Claims priority, application Austria, Nov. 9, 1976, 8305/76

Int. Cl.² A47C *1/08*

U.S. Cl. 297—254 **10 Claims**

1. A safety transport device for accommodating a child which is adapted to be detachably connected to an adult chair lift seat comprising, a safety seat having a seat portion and a connected back portion formed of a unitary construction, said safety seat being sized to accommodate a small child and to be fitted on a seat portion of an adult chair lift, a safety bar, said safety bar including a pair of side arm portions, and an interconnected cross bar adapted to extend across the lap of a small child seated in said safety seat, said side arm portion being L-shaped to extend forwardly and upwardly, said upwardly extending portions being disposed along the sides of said back portion of said safety seat, pivot means for pivotally connecting said upwardly extending portions to said back portion of said safety seat for pivoting said safety bar into an operative position, said upwardly extending portions having their respective upper ends laterally bent to extend rearwardly of said back portion of said safety seat, said rearwardly bent upper ends being adapted to extend over and contact the back portion of the chair lift seat when the safety device is connected to the chair lift seat, said rearwardly bent upper ends preventing a pivoting of and locking said safety bar in the operative position of said safety seat when said ends extend over and contact the



back portion of the chair lift, a linking means for linking said safety seat to said chair lift seat, said linking means including a member connected to and disposed rearwardly of said safety seat which is slidably mounted relative to said safety seat, said member being adapted to hook over the back portion of the chair lift seat in the operative position of said safety seat and be slid downwardly behind the chair lift seat back portion, and said member defining a handle to facilitate the handling of said safety seat, and a central support connected to said cross bar, said central support extending between said cross bar and the seat portion of said safety seat.

4,175,787

DOUBLE SHOULDER LAP SAFETY BELT

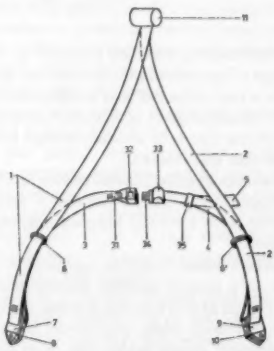
Kurt (Ulrich) Muskat, Hamburg, Fed. Rep. of Germany, assignor to Klippan GmbH Sicherheitsgerate, Hamburg, Fed. Rep. of Germany

Filed Mar. 13, 1978, Ser. No. 887,099

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1977, 2710591

Int. Cl.² A62B *35/00*

U.S. Cl. 297—484 **6 Claims**



1. A vehicle safety belt system for a passenger seat having a back rest and seat cushion comprising:

(a) a continuous length of seat belt webbing forming two shoulder belt portions adapted to extend down over the shoulders of a vehicle occupant and a lap belt portion comprising a releasable buckle and tongue interconnection;

(b) a first anchoring means for anchoring the upper portion

of said shoulder belt portions behind the upper back rest area;

(c) a second anchoring means for anchoring the lower portion of said shoulder belt portions on each side of the seat adjacent the bottom thereof, said second anchoring means having pass-through fittings;

(d) a third anchoring means for anchoring the lower portion of said lap belt portion on each side of the seat adjacent the bottom thereof, said third anchoring means having pass-through fittings; and

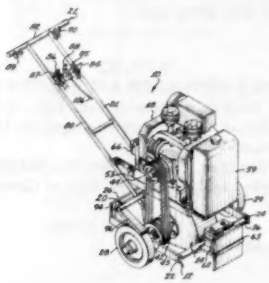
(f) a fastening and guiding means for fastening said lap belt portion and said shoulder belt portions to each other above said second and third anchoring means and for jointly guiding said lap belt portion and said shoulder belt portions such that one belt portion lies on top of the other, said fastening and guiding means being disposed in the area of the line of contact between the seat cushion and the back rest.

4,175,788

PAVEMENT CUTTING MACHINE

Carl C. Jacobson, Tempe, and Gaius P. Crosby, Mesa, both of Ariz., assignors to Crafco, Inc., Phoenix, Ariz.

Filed Apr. 10, 1978, Ser. No. 894,923
Int. Cl.[2] E01C *23/09*
U.S. Cl. 299—1 **11 Claims**



1. A pavement cutting machine comprising:

(a) a carriage of open configuration having a pair of spaced side rails, a rear cross rail and a front cross bar;

(b) a pair of axially aligned wheels each attached to a different one of the side rails of said carriage intermediate the front and rear ends thereof;

(c) a downwardly opening shroud having its front end pivotably coupled to the front cross bar of said carriage and disposed to lie in a central location intermediate the side rails thereof;

(d) cutter wheel means rotatably journaled in said shroud so as to lie in a central location intermediate said pair of wheels with its axis of rotation possible through the axis of said pair of wheels when said shroud pivotably moved;

(e) linear actuator means having one of its ends coupled to said shroud and having its other end coupled to the rear cross rail of said carriage and actuatable for pivotably moving said shroud to lower said cutter wheel means into a pavement cutting position below said carriage;

(f) an engine mounted on top of said shroud for movement therewith; and

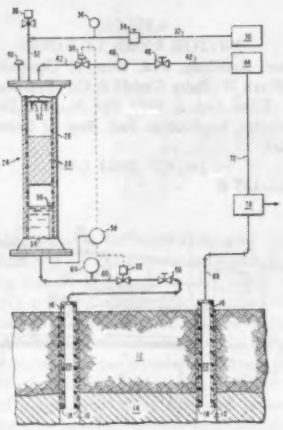
(g) drive means connected between said engine and said cutter wheel means for rotatable driving thereof.

4,175,789

SOLUTION MINING UTILIZING DISSOLVED OXYGEN WITH ELIMINATION OF ENTRAINED GAS

Wolfram H. Kube, Denver, and David L. Shuck, Littleton, both of Colo., assignors to Wyoming Mineral Corporation, Lakewood, Colo.

Filed Apr. 25, 1978, Ser. No. 900,038
Int. Cl.[2] E21B *43/28*
U.S. Cl. 299—4 **9 Claims**



1. A method for leaching mineral values from an underground ore body, in situ, comprising:

drilling at least one well into said ore body;

casing and sealing said well;

contacting an oxygen-bearing gas with a leach solution above ground and causing oxygen to become dissolved in said leach solution while eliminating entrained oxygen-bearing gas from said leach solution prior to injection into said well;

introducing said leach solution through said well and into said ore body where said leach solution contacts and oxidizes said mineral values with said mineral values becoming dissolved in said leach solution;

recovering said leach solution with said mineral values dissolved therein; and

treating said leach solution to extract said mineral values therefrom.

4,175,790

PROCESS FOR THE PRECONCENTRATION OF METALLIFEROUS PRODUCTS

Jean-Jacques Predali, Elancourt, France, assignor to Minemet Recherche, Trappes, France

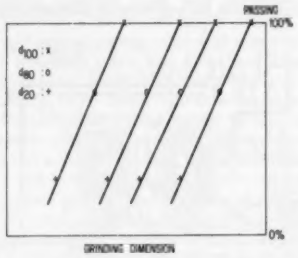
Filed Feb. 16, 1978, Ser. No. 878,458
Claims priority, application France, Feb. 16, 1977, 77 04361
Int. Cl.[2] B02C *23/08, 23/18*
U.S. Cl. 299—7 **22 Claims**

1. A process for the preconcentration of metalliferous values contained in a metal-bearing ore material selected from the group consisting of an ore and a byproduct thereof, comprising:

(a) subjecting the ore material to careful attrition, so that the fraction d_{80}/d_{20}, wherein

d_{80} represents the smallest mesh which permits 80% of the ore material to pass through, and

d_{20} represents the smallest mesh which permits 20% of the ore material to pass through
increases in the course of successive attritions; and



(b) recovering a cut containing the metalliferous values in concentrated form from the resulting attrited particle mixture.

4,175,791

HYDRAULIC BRAKE PRESSURE CONTROL APPARATUS FOR MOTOR VEHICLES

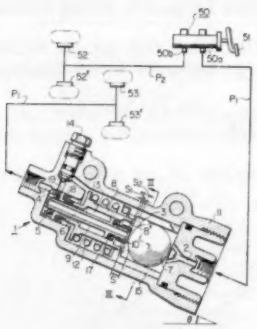
Tomoyuki Nogami, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 17, 1978, Ser. No. 887,739

Claims priority, application Japan, Apr. 15, 1977, 52-47622[U]

Int. Cl.[2] B60T *8/14*

U.S. Cl. 303—24 A **6 Claims**



1. In an apparatus for controlling hydraulic pressure delivered to hydraulic brake cylinders for rear wheels of a motor vehicle comprising:

a housing having a first hydraulic chamber hydraulically communicated with a master brake cylinder and a second hydraulic chamber hydraulically communicated with the hydraulic brake cylinders for the rear wheels;

a communication passage for communication between said first and second chambers;

a valve element disposed in said first hydraulic chamber and operable to close said communication passage; and

a differential piston having first and second pressure receiving regions exposed, respectively, in said first and second hydraulic chambers and adapted to control increase in the hydraulic pressure in said rear wheel brake cylinders in response to increase in the hydraulic pressure within said master cylinder after said communication passage has been closed by said valve element;

the improvement wherein said differential piston is disposed in series with said valve element and is displaceable in the direction toward said first hydraulic chamber to bear against said valve element thereby to prevent said valve element from closing said communication passage in dependence on load states of said motor vehicle, said first pressure receiving region of said differential piston being exposed in said first hydraulic chamber and having a smaller effective area than said second pressure receiving region exposed in said second hydraulic chamber so that said differential piston tends to move in the direction toward said first hydraulic chamber when said first and second fluid chambers are communicated with each other through said communication passage, spring means being disposed in said housing for resiliently urging said differential piston in the direction toward said second hydraulic chamber.

4,175,792

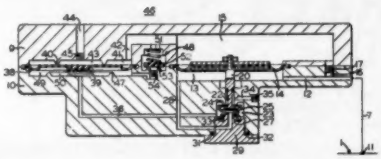
CONTINUAL QUICK SERVICE VALVE DEVICE

James E. Hart, Trafford, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Division of Ser. No. 779,672, Mar. 21, 1977. This application Sep. 14, 1978, Ser. No. 942,234

Int. Cl.[2] B60T *15/44*

U.S. Cl. 303—37 **5 Claims**



1. In a fluid pressure brake equipment, the combination of a brake pipe normally charged with fluid to a certain chosen pressure and a continual quick service valve device comprising:

(a) a control volume; (b) choke means for controlling the rate of flow of fluid pressure from said brake pipe to said control volume, whereby said control volume is charged to the pressure in said brake pipe;

(c) a piston abutment to one side of which is connected fluid pressure directly from said control volume and to the opposite side of which is connected fluid pressure from said brake pipe;

(d) a first annular valve seat;

(e) a valve element;

(f) first bias means for urging said valve element toward engagement with said first valve seat, said piston abutment being operative to unseat said valve element responsive to a pressure differential thereacross whenever a reduction of said brake pipe pressure arises;

(g) a second annular valve seat;

(h) a diaphragm valve subject opposingly to said brake pipe and control volume pressures;

(i) second bias means for urging said diaphragm valve toward engagement with said second valve seat;

(j) a delivery passage via which said brake pipe pressure is connected from said opposite side of said piston abutment to said diaphragm valve to urge said diaphragm valve toward engagement with said second valve seat in concert with said second bias means;

(k) a third annular valve seat coaxial with and spaced apart from said second annular valve seat such that said diaphragm valve is disposed therebetween for engagement with said third seat upon disengagement from said second seat;

(l) a one-way flow valve via which brake pipe pressure is connected from said delivery passage to said control volume only when said diaphragm valve is disengaged from said third valve seat; and

(m) an exhaust passage connected to said delivery passage, said exhaust passage having said first valve seat arranged therewith so as to effect local venting of said brake pipe

pressure when said valve element is unseated, said local venting of said brake pipe pressure effecting a pressure differential across said diaphragm valve to disengage said diaphragm valve from said second valve seat and, in turn, vent said control volume pressure via said second valve seat sufficient to counteract the pressure differential across said piston abutment.

4,175,793

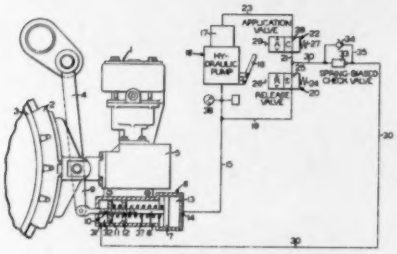
PARKING BRAKE CONTROL SYSTEM FOR RAILWAY VEHICLES

Clemmons, Quenten T., Irwin, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Oct. 2, 1978, Ser. No. 947,970

Int. Cl.[2] B60T *17/16*

U.S. Cl. 303—89 **7 Claims**



1. Parking brake apparatus for use in conjunction with a tread brake unit of a railway vehicle including a brake shoe pivotally suspended on a brake shoe hanger through which braking forces are applied to the brake shoe, said parking brake apparatus comprising:

(a) a locking cylinder device mechanically connected to the brake shoe hanger, said locking cylinder device having a normal release position in which braking forces on the brake shoe hanger are released, and being operable responsively to fluid pressure to an application position in which braking forces are applied to the brake shoe hanger;

(b) fluid pressure supply means for supplying fluid pressure to said locking cylinder device for causing it to be operated to its said application position;

(c) locking nut means in said locking cylinder device operable, when subjected to said fluid pressure from said fluid pressure supply means subsequently to operation of the locking cylinder device to its said braking position, to a locking position for maintaining the locking cylinder device in its said application position;

(d) delay means interposed between said fluid pressure supply means and said locking nut means for allowing operation of the locking cylinder device to its said application position ahead of operation of the locking nut means to its said locking position; and

(e) release valve means for effecting operation of said locking nut means to an unlocked position in which said locking piston device is released from its said application position.

4,175,794

MODULATOR VALVE FOR A SPINNING AND SKIDDING WHEEL ASSEMBLY

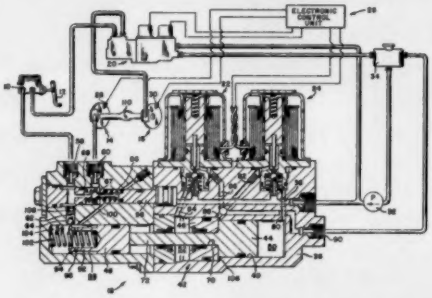
Edward M. Pauwels, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Filed May 1, 1978, Ser. No. 901,405

Int. Cl.[2] B60T *8/08*

U.S. Cl. 303—105 **10 Claims**

1. In a brake system having a fluid pressure generator communicating pressurized fluid to a rotatable wheel assembly, a control unit responsive to the speed of rotation of the wheel assembly, a modulator valve controlling fluid communication between the fluid pressure generator and the wheel assembly and a pressure source communicating with the modulator valve, the improvement wherein the modulator valve comprises a housing having at least one bore and a piston assembly is slidably mounted in the one bore to substantially define a pair



of pressure chambers the control unit cooperating with the modulator valve to vent one of said pair of pressure chambers when a skidding condition exists for the wheel assembly and the control unit cooperating with the modulator valve to vent said other pressure chamber when a spinning condition exists for the wheel assembly.

4,175,795

FLUID-PRESSURE OPERATED ANTI-SKID BRAKING SYSTEM FOR VEHICLES

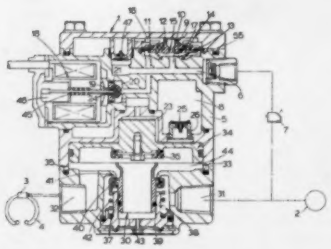
Ivan Mortimer, Solihull, and Charles T. Layton, Birmingham, both of England, assignors to Girling Limited, Birmingham, England

Filed Jul. 6, 1978, Ser. No. 922,331

Claims priority, application United Kingdom, Jul. 9, 1977, 28885/77

Int. Cl.[2] B60T *8/02*

U.S. Cl. 303—118 **9 Claims**



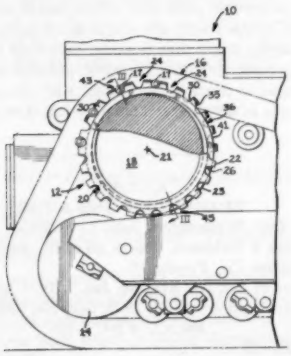
1. A fluid-pressure operated anti-skid braking system for vehicles comprising a brake for braking a wheel, a supply of operating fluid under pressure for operating said brake, fluid-flow control valve means through which fluid from said supply is supplied to said brake, deceleration responsive means responsive to a skid signal for operating said valve means to relieve the brake pressure of fluid supplied to said brake at a skid point when the deceleration of said wheel is excessive and exceeds a predetermined value, a memory chamber for storing a memory pressure dependent upon the brake pressure occurring at said skid point to provide a changeover point between first and second stages of brake re-application, said first stage comprising the re-application of said operating fluid from said supply until a pressure less than the pressure of said skid point is attained at said changeover point, and said second stage comprising the continued re-application of said operating fluid but at a reduced rate of pressure increase, operator-controlled

means for providing a control pressure, means defining an application chamber to which said control pressure is supplied, a relay valve operable in response to control pressure in said application chamber for controlling said brake pressure, a supply passage through which said control pressure is supplied to said application chamber from said operator-controlled means, a latch valve disposed in said supply passage, a connection between said supply passage and said memory chamber downstream of said latch valve, and a one-way valve permitting flow through said connection only into said memory chamber, said latch valve being movable between an open position in which said control pressure can be supplied to said application chamber and to said memory chamber through said supply passage and a closed position, and a restricted passage through which said control pressure can be supplied to said application chamber and to said memory chamber at least when said latch valve is closed, wherein said deceleration responsive means includes a valve member movable between a first position in which said application chamber is isolated from an exhaust port and said supply passage is in communication with both said application chamber and said memory chamber and a second position at the skid point in which said supply passage is isolated from said application chamber and said memory chamber, and said application chamber and said supply passage at least on the downstream side of said valve member are exhausted to said exhaust port so that braking is relieved, skid correction returning said valve member to said first position with said latch valve closing so that brake re-application can occur rapidly during the first stage with said control pressure supplied to said application chamber through said restricted passage until said changeover point is reached at which pressure in said application chamber equals said memory pressure in said memory chamber, whereafter re-application in the second stage continues at a reduced rate since said control pressure supplied through said restricted passage has also to increase said pressure of said memory chamber.

4,175,796
TRACK-TYPE VEHICLE WHEEL CLEANING APPARATUS

Roger L. Boggs, East Peoria, and Jon C. Christensen, Chillicothe, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 26, 1978, Ser. No. 909,760
Int. Cl.[2] B62D 55/14
U.S. Cl. 305—11 **9 Claims**



1. In a wheel having a hub, a rim having an outer surface and being connected to the hub, and teeth being positioned about the outer surface of the rim and being arcuately spaced one from the other by a root area, said root areas having an outer periphery and defining a root diameter, the improvement comprising:

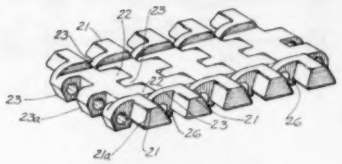
said wheel having an annular opening having an inner diameter and an inner surface and being in communication with the outer periphery of the root areas, said inner diameter being less than the root diameter; and

a hoop having inner and outer diameters and being positioned in the annular opening and free from connection with the wheel, said inner and outer diameters being greater than the inner diameter of said annular opening and the root diameter, respectively.

4,175,797
GROUND ENGAGING TREAD OR TRACK COMPRISED OF IMPROVED ARTICULATED CRAWLER PADS, FOR TREADED VEHICLES SUCH AS MINING MACHINES AND THE LIKE

Claude B. Krekeler, Cincinnati, Ohio, assignor to The Cincinnati Mine Machinery Company, Cincinnati, Ohio

Filed Oct. 12, 1977, Ser. No. 841,573
Int. Cl.[2] B62D 55/20
U.S. Cl. 305—53 **5 Claims**



1. An improved crawler pad for a crawler tread such as may be used on mining machines and the like, said crawler pad being comprised of an uninterrupted solid central portion extending from one end of said crawler pad to the other end thereof, the length of said crawler pad from end to end determining the width of a said tread; a first solid end portion at said one end, said first solid end portion constituting an integral continuation of said solid central portion, and a second solid end portion at said other end, said second solid end portion constituting an integral continuation of said solid central portion, and said first and said second solid end portions providing a pair of shoulders extending upwardly from said solid central portion; at least one first main grouser element extending from one side of said solid central portion at right angles thereto and spaced from both of said solid end portions; at least two second main grouser elements extending from an opposite side of said solid central portion and at right angles thereto, said second main grouser elements being spaced from one another such that said first main grouser element is opposite the space defined by said second main grouser elements, and one of said second main grouser elements being spaced from the said solid end portion which is nearest to said one of said second grouser elements whereby to define a tooth receiving space; all of said first and of said second main grouser elements being substantially co-extensive with said solid central portion, both of said second main grouser elements which are nearest their respective said solid end portions being provided with upstanding portions constituting a continuation of the said shoulders; pintle receiving bores in all of said grouser elements, said grouser elements being otherwise solid in the manner of said solid central portion and of said solid end portions; the said bores being so located in their respective main grouser elements that when, in making up a crawler tread, a first said main grouser element on one of said pads is located between the second main grouser elements on an adjacent said pad, the said pintle receiving bores of interdigitated grouser elements will be aligned so as to be capable of receiving a pintle to articulately join the interdigitated pads; the said tooth receiving space being open ended in a sideways direction from said one of said second main grouser elements along the length of said pad towards that said solid end portion which is nearest to the said one of said second main grouser elements, said tooth receiving space being beyond said grouser elements and out-

side of said shoulders and outside of said upstanding portions, and the said tooth receiving space being sufficient to permit the tooth of a drive sprocket to drivingly engage the said last mentioned solid end portion of said pad, whereby to provide a maximum bearing surface for a said tooth.

4,175,798

ENDLESS TREAD OF THE SINGLE-PIN TYPE

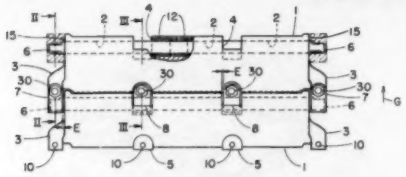
Otto Körner, Wermelskirchen, and Christian Bardiani, Wuppertal, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremburg, Fed. Rep. of Germany

Filed Apr. 6, 1978, Ser. No. 894,116

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1977, 2755412

Int. Cl.[2] B62D *55/20*

U.S. Cl. 305—58 R **10 Claims**



1. Endless tread pursuant to the single-pin type including a rubber-supported bolt in a tread member, and connecting components in the form of a clamp connection for nonrotative fastening of said bolt to said tread member, characterized through the combination of:

a bolt being provided with rubber rings vulcanized thereon and being pressable into a transverse bore in said tread member;

clamping lugs being slidable onto said bolt and clamping the latter to form a detachable connection with an adjoining tread member; and

said tread includes, in the travel direction, at least two cogs on one side of said tread member and, on the other side, in the region of said bolt includes free recesses for the assembly and fastening of said clamping lugs, and said clamping lugs being form-fittingly but releasably fastened to said cogs and said bolt.

4,175,799

HYDRODYNAMIC BEARING HAVING ANTICAVITATION RECESSES

Billy J. Davis, East Peoria; Cletus M. Kinsey; Hwa J. Shen, both of Peoria, and James R. Weber, Chillicothe, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

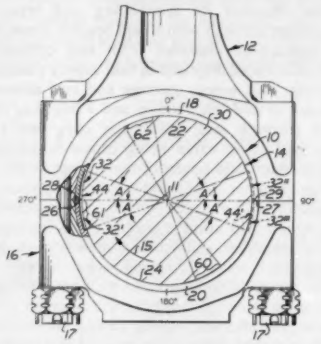
Filed May 26, 1978, Ser. No. 909,754

Int. Cl.[2] F16C *9/02*

U.S. Cl. 308—9 **8 Claims**

1. In a hydrodynamic bearing (**10**) having an axis (**11**), first and second bearing halves (**18,20**), each half (**18,20**) having a bearing face (**22,24**), first and second ends (**26,27**) (**28,29**), first and second sides (**40,42**) and extending about 180° around a shaft member (**30**) with the first and second respective ends (**26,28**) (**27,29**) contacting, the improvement comprising:

a slot (**32**) having a bottom surface (**34**), a pair of substantially parallel sidewalls (**38**), and an uninterrupted inner end wall (**36**) connected between the sidewalls (**38**), the slot (**32**) being formed in at least one of said bearing faces (**22,24**) and extending from a respective end (**26,27,28,29**) a preselected peripheral distance (L) along the bearing face (**22/24**) to the inner end wall (**36**) and being spaced from each of the sides (**40,42**) to form opposite fluid containment barrier ribs (**43**) and a fluid trap of preselected volumetric capacity, said inner end wall (**36**) being substantially parallel to the axis (**11**) and defining a substantially 90° outer edge (**56**) relative to the bearing face



(**22/24**), and said bottom surface (**34**) being of substantially uniform depth from the bearing face (**22/24**).

4,175,800

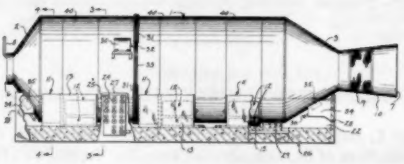
FLUID BEARING SUPPORTING SYSTEM FOR ROTARY DRUMS AND THE LIKE

David H. Chaffee, Neenah, and Earl L. Tipler, Winnecone, both of Wis., assignors to Overly, Inc,, Neenah, Wis.

Filed Jan. 9, 1978, Ser. No. 867,792

Int. Cl.[2] F16C *32/06*

U.S. Cl. 308—9 **13 Claims**



2. A supporting system for a generally cylindrical drum comprising fixed parking saddle means supporting the drum in stationary position, hydraulic fluid bearing means to lift the drum free of contact with said saddle means and to float the same out of contact with any physical support, and means to rotate the drum while thus floating, said fluid bearing means comprising a plurality of expansible pads of large face area emitting liquid in direct fluid contact with the drum over the large face area of the pads at a pressure less than approximately 50 P.S.I.

4,175,801

BEARING HAVING A TAB

Donald A. Coil, Washington; John L. Johnson, Jr., Brimfield, and Horace J. Swinland, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 813,586, Jul. 7, 1977, abandoned. This application Aug. 2, 1978, Ser. No. 930,449

Int. Cl.[2] F16C *3/06*

U.S. Cl. 308—23 **15 Claims**

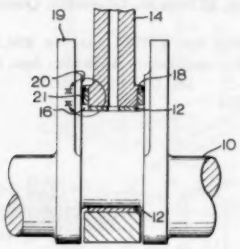
1. A bearing insertable into a cavity of preselected configuration defined by structure including first and second members, said structure defining a reduced cross-sectional area of said cavity at a preselected location of said structure, comprising:

a body having a periphery and being positionable in contact with one of the first and second members in response to inserting said bearing into the cavity;

a surface on said body; and

at least one tab extending from said periphery adjacent said

surface, said tab being of a different cross-sectional dimension than said body and of a construction sufficient for insertion into said preselected cavity at said reduced cross-sectional area for insertion of said bearing into said preselected cavity with said surface oriented toward only a



preselected one of the first and second members, and being free from engagement with said structure and spaced a preselected distance from said structure at the preselected location in response to said body of the bearing being in contact with the other one of the preselected one of said first and second members.

4,175,802

BORING SPINDLE WITH AUTOMATIC TOOL LIFTOFF

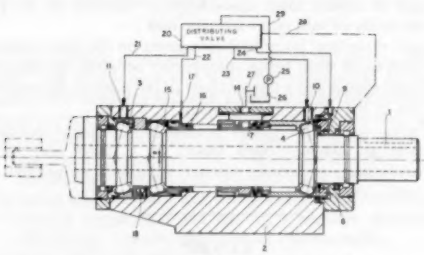
Horst Voll, Hassfurt; Franz Kessler, Ebern, and Max Herla, Schwebheim, all of Fed. Rep. of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Fed. Rep. of Germany

Filed Mar. 3, 1978, Ser. No. 883,049

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1977, 2709448

Int. Cl.[2] B23B *29/034*

U.S. Cl. 308—9 **8 Claims**



1. A spindle unit for the fine boring of a workpiece, comprising:

a spindle housing;

a shaft received in said housing and formed with a tool end and a drive end;

at least two axially spaced main bearings received in said housing and journaling said shaft therein, one of said main bearings being disposed proximal to said tool end and the other of said main bearings being disposed proximal to said drive end;

at least one further bearing received in said housing proximal to said tool end and constructed and arranged to take up the journaling of said shaft, said further bearing having an inner running surface having a center offset from the axis of rotation of said main bearings whereby, during the boring of said workpiece, the main bearings are effective to journal the shaft and said further bearing is received with radial play in the housing while during return movement of the shaft, the said one of said main bearings being received with radial play in the housing while said further bearing is effective to journal the shaft about its axis;

a respective frustoconical support ring for at least one of the bearings proximal to said tool end, the radial play of said one of the bearings proximal to said tool end being produced by axial displacement of said frustoconical bearing support ring;

a hydraulic piston operatively connected to said bearing support ring for axially displacing same; and

a spring bearing upon said bearing support ring in a direction opposite the direction in which said piston is effective.

4,175,803

BEARING ASSEMBLY BETWEEN INNER AND OUTER SHAFTS HAVING TWO ROLLER BEARINGS AND TWO HYDRODYNAMIC OR SQUEEZE FILM BEARINGS

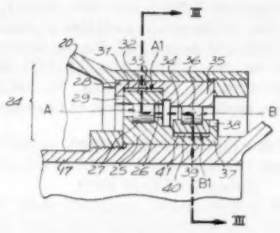
Derek A. Roberts, Bristol, England, assignor to Rolls-Royce Limited, London, England

Filed May 30, 1978, Ser. No. 910,671

Claims priority, application United Kingdom, Jun. 14, 1977, 24888/77

Int. Cl.[2] F16C *27/04*

U.S. Cl. 308—9 **3 Claims**



1. A bearing assembly comprising two respectively radially inner and outer rotary members, first and second rotary motion bearings each arranged radially between said members and each having an inner and an outer race, said inner member and the inner race of the first rotary motion bearing being radially relatively fixed, said outer member and the outer race of the first rotary motion bearing being radially relatively movable, means defining a first hydrodynamic film bearing between said outer member and the outer race of the first rotary motion bearing. said outer member and the outer race of the second rotary motion bearing being radially relatively fixed, said inner member and the inner race of the second rotary motion bearing being radially relatively movable, and means defining a second hydrodynamic film bearing between said inner member and inner race of the second rotary motion bearing.

4,175,804

FLEXIBLE SPRING BEARING

Hans U. Pannwitz, P.O. Box 67, Odessa, Fla. 33556

Filed Sep. 20, 1977, Ser. No. 834,903

Int. Cl.[2] F16C *27/06*

U.S. Cl. 308—26 **19 Claims**

1. A flexible spring bearing having a substantially cylindrical configuration and comprising at least one arcuate portion extending circumferentially about at least one section of said cylindrical configuration;

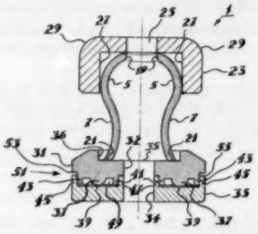
a main bearing race with an aperture therein concentric with the said cylindrical configuration and disposed contiguous with an end portion of said cylindrical configuration;

a thrust race disposed contiguous to said main bearing race;

bearing means disposed between said main bearing race and said thrust race whereby said main bearing race may rotate upon said thrust race;

said bearing means including at least one protrusion integrally extending from one of said races and annularly

disposed concentric with said cylindrical configuration; and



said main bearing race further comprising an inner annular skirt and an outer annular skirt thereby forming a channel about said bearing means located therein for receiving a lubricant.

4,175,805

ONE-PIECE INTERMEDIATE MEMBER FOR ANTI-FRICTION BEARINGS

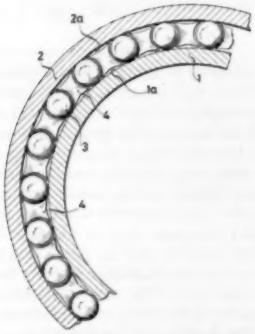
Dieter Becker, Lippstadt-Esbeck, and Alois Stenert, Lippstadt, both of Fed. Rep. of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Continuation of Ser. No. 777,127, Mar. 14, 1977, abandoned. This application Jul. 13, 1978, Ser. No. 924,342

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1976, 2610705.

Int. Cl.[2] **F16C** *19/20*

U.S. Cl. 308—199 **8 Claims**



1. For use in connection with an anti-friction bearing having an inner raceway and an outer raceway and a plurality of anti-friction bodies movably arranged between said inner and outer raceways; a spacer member having two oppositely located end faces defining a central axis as well as an interior of the spacer member therewith and consisting of a single integral piece for insertion between and engagement with two adjacent anti-friction bodies of said anti-friction bearing and including: peripheral supporting means insertable between the inner and outer raceways of said anti-friction bearing, a partition arranged radially inwardly of said peripheral supporting means and being substantially parallel to said end faces while dividing the interior of said spacer member into two compartments, each one of said compartments comprising a grate-like structure including strip-shaped reinforcing means coaxially arranged with and in spaced relationship to the central axis of said spacer member which is substantially perpendicular to said partition, said grate-like structure also including webs connecting said reinforcing means to said supporting means and also including ribs connecting said supporting means to said partition, said ribs having free inner ends spaced from said central axis, and said ribs and said reinforcing means and said webs defining surface sections curved in conformity with the curvature of the peripheral surface of the anti-friction bodies to be engaged by said spacer member.

4,175,806

RADIUS ROD OR ROCKER ARM BUSHES

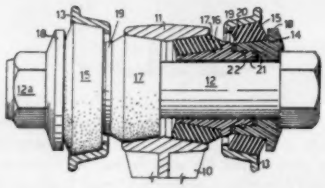
Gordon J. Taylor, 18 Seng St., Graceville, Queensland, Australia (4075)

Filed Apr. 6, 1978, Ser. No. 894,109

Claims priority, application Australia, Apr. 6, 1977, PC9702

Int. Cl.[2] **F16C** *27/00*

U.S. Cl. 308—238 **5 Claims**



1. A bearing for oscillatory motion including:

a pair of fixed side members,

coaxial coned apertures in said side members, tapering towards each other,

a pin passing through and spaced from said coned apertures in the side members,

an oscillatable member,

an eye on the oscillatable member, a passage through the eye being tapered from both ends and being about and spaced from the pin,

a pair of outer spacers on the pin,

a pair of resilient outer bushes engaged on the outer spacers and compressed between said outer spacers and the coned apertures of said fixed side members,

a pair of tubular inner spacers freely rotatable on the pin, inwardly of said outer spacers, and

a pair of resilient inner bushes engages on the inner spacers, each inner bush being compressed between the adjacent inner spacer and a tapered part of the passage through the eye of the oscillatable member,

wherein each inner spacer is releasably engaged coaxially with an adjacent outer spacer by a spigot and socket connection permitting relative rotational movement between the inner and outer spacers.

4,175,807

MODULAR CONSTRUCTIONAL UNITS FOR A COMBINED STORAGE BIN AND DISPLAY ASSEMBLY

Joel H. Kranich, 1 Parkton Pl., Pittsburgh, Pa. 15232; Robert A. Adam, and Charles L. Culbertson, both of Pittsburgh, Pa., assignors to Joel H. Kranich, Pittsburgh, Pa.

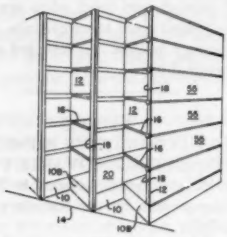
Filed Nov. 16, 1978, Ser. No. 961,350

Int. Cl.[2] **A47B** *53/00;* **A47F** *3/00;* **A47B** *47/00*

U.S. Cl. 312—118 **17 Claims**

1. A combined storage bin and display assembly for decorative paper and the like, said assembly comprising vertically-stacked and horizontally-adjoined modular constructional units extending along an essentially straight-line path while forming storage bins and displays disposed at an angle with respect to said straight-line path, said modular constructional units each essentially including a horizontal wall section to define in a vertical stack of constructional units at least a bin ceiling or a bin floor, and a side wall section extending vertically from said horizontal wall section along two intersecting peripheral edge portions thereof, said side wall section defining a rear end wall and a longitudinal bin side wall having an outwardly-facing vertical display area extended beyond the

forward edge of said horizontal wall section, said horizontal wall section and said side wall section each having support



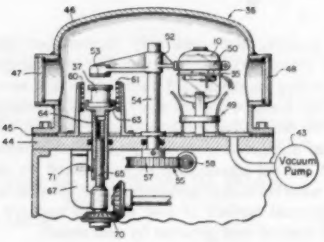
surfaces for either vertical stacking or horizontal adjoining of modular constructional units.

4,175,808

METHOD AND APPARATUS FOR PRODUCING ELECTRONIC DEVICES

Serge Pakswer, Elmhurst, and Constantin S. Szegho, Chicago, both of Ill., assignors to Ni-Tec, Inc., Niles, Ill.

Filed Jan. 3, 1966, Ser. No. 518,478
Int. Cl.[2] H01J *9/18*
U.S. Cl. 316—19 **9 Claims**



1. The method of constructing an electronic device comprising a first component and a second component having an opening for receiving said first component to form therewith a closed system, which method comprises the following steps:

processing at least a portion of said first component in an enclosure having an environment substantially free of contaminants harmful to said processed portion;

locating said enclosure in a transfer chamber containing said second component and having a transfer environment which may include said harmful contaminants;

opening said enclosure;

and assembling said first and second components to form said closed system while exposing said processed portion of said first component to said transfer environment for only a predetermined short time.

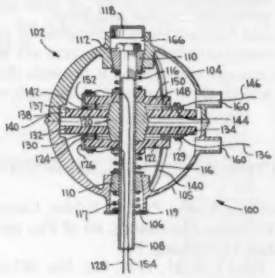
4,175,809

ROTATABLE ELECTRICAL CONNECTOR UNITS AND LIGHTING DEVICES INCORPORATING SAME

Joseph R. Dusko, 3436 Cascade Dr., Youngstown, Ohio 44511

Filed Apr. 7, 1978, Ser. No. 894,394
Int. Cl.[2] H01R *39/00*
U.S. Cl. 339—1 L **16 Claims**

1. A rotatable electrical connector unit adapted for use in a lighting device comprising a shaft which is at least partially hollow, at least three electrically insulating discs mounted transversely on said shaft, each of said discs carrying at least one electrical contact ring, said electrical contact rings arranged on said discs such that there are two pairs of electrical contact rings, each pair separated from each other, and such that the contact rings of each pair are in slidable electrical contact with each other, a housing including two portions capable of rotating relative to each other and about said shaft and said discs, the housing portions fixed to each end of the shaft and the shaft includes a rotatable joint within the housing which allows the end portions of the shaft and their respective housing portions to be rotated with respect to each other about



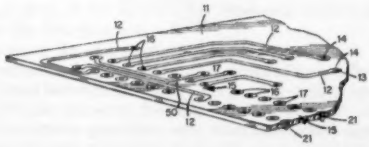
the longitudinal axis of the shaft, one portion of the housing engaging at least one of the discs such that when the housing portion is rotated relative to the shaft, the engaged disc is caused to rotate about the shaft, and at least four electrical conductors extending from the unit, each electrical conductor attached to a different contact ring.

4,175,810

ELECTRICAL INTERCONNECTION BOARDS WITH LEAD SOCKETS MOUNTED THEREIN AND METHOD FOR MAKING SAME

Richard C. Holt, Fairhaven, Mass.; Neil F. Damon, Manville, R.I., and Richard J. Hanlon, Attleboro, Mass., assignors to AUGAT Inc., Attleboro, Mass.

Continuation-in-part of Ser. No. 744,134, Nov. 22, 1976, Pat. No. 4,097,101. This application Nov. 18, 1977, Ser. No. 852,720
The portion of the term of this patent subsequent to Jun. 27, 1995, has been disclaimed.
Int. Cl.[2] H01R *13/40*
U.S. Cl. 339—17 C **16 Claims**



1. An electrical interconnection device comprising:

a flat generally rectangular sheet of electrically insulative compliant material;

electrically conductive material secured in discrete areas on at least one side of said sheet, said sheet having a multiplicity of holes therethrough, at least some of said holes normally intercepting at least some of said areas of electrically conductive material;

electrically conductive plating material on the inside surfaces of at least some of said holes thereby forming plated-through holes, said plating material being electrically interconnected with said respective intercepted discrete areas of electrically conductive material;

a lead socket formed with a substantially non-compliant cylindrical body portion having a circumferential groove therein intermediate the ends of said body portion, an axial opening through said lead socket, a plurality of flexible fingers normally converging toward one another at one end of said body portion and a tapered entry opening at the other end, one of said lead sockets being mounted in each of at least some of said plated-through holes, said

body portion having an external diameter larger than the internal diameter of said plated-through holes thereby forming an interference fit therewith, some of said plating material in said plated-through holes, which material is relatively compliant with respect to said body portion, being radially displacd by said body portion upon insertion thereof and partially filling said circumferential groove when said lead socket is fully seated with said groove positioned within said hole;

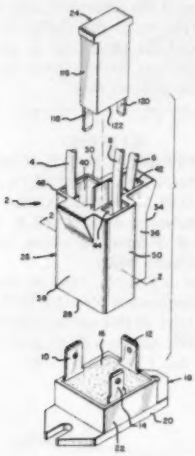
whereby said tapered entry is adapted to receive an electronic component lead, said fingers are adapted to frictionally engage said lead as it projects through said lead socket, and air flow is permitted through said lead socket.

4,175,811

CONNECTOR HAVING SNUBBER NETWORK FOR TRIAC

Daniel R. Coldren, Enola; Paul R. Krider, Camp Hill, and Benjamin C. Williams, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 27, 1978, Ser. No. 881,468
Int. Cl.[2] H01R *31/06*
U.S. Cl. 339—19 **5 Claims**



1. An electrical connector for connecting first, second, and third wires to first, second, and third main terminal tabs respectively and for connecting a network between said first and second main tabs, said main tabs extending normally from a surface of a triac or the like, said connector comprising:

an insulating housing having a mating face and a wire-receiving face, first, second, and third terminal-receiving cavities extending through said housing from said wire receiving face to said mating face,

first, second, and third terminals in said first, second, and third cavities, said terminals being proximate to said mating face, and being crimped onto said first, second, and third wires, said wires extending from said wire receiving face, each of said terminals having a main receptacle at said mating face which is mateable with one of said main tabs,

each of said first and second terminals only having a secondary receptacle integral therewith, said secondary receptacles being parallel to and beside, their associated main receptacles,

a module-receiving cavity extending into said housing from said wire-receiving face, said module-receiving cavity communicating with said first and second terminal-receiving cavities,

a snubber module in said module-receiving cavity, said snubber module having first and second network terminal tabs extending therefrom, said network terminal tabs being mated with said first and second secondary receptacles whereby,

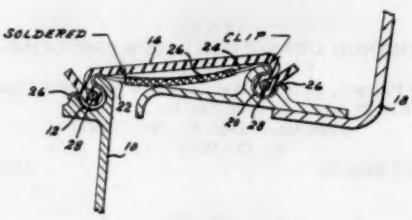
upon movement of said mating face against said surface of said triac, said first, second, and third wires are connected to said first, second, and third main terminal tabs, and circuitry contained in said snubber module is connected across said first and second main terminal tabs.

4,175,812

ELECTRICALLY CONDUCTIVE BONDING STRAP FOR CONNECTING MOVABLE PARTS

Arlo K. Palmer, Renton, Wash., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 30, 1978, Ser. No. 891,873
Int. Cl.[2] H02G *13/00*
U.S. Cl. 339—29 R **5 Claims**



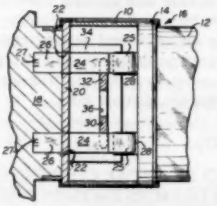
1. A bonding strap assembly located between relatively movable panels having corresponding arcuate grooves and a seal extending between said panels and held securely in said grooves by a means sufficiently large to expand said seal and prevent its removal from the grooves the improvement comprising an elongated electrically conductive means having a first and second connecting means affixed to opposite ends thereof, wherein said connecting means are shaped to conform to the internal surface of said grooves and are held within different ones of said grooves by said means.

4,175,813

TAMPER-PROOF ADAPTOR FOR AN ELECTRIC METER

John P. Mentesana, 1430 Seigart Blvd., Far Rockaway, N.Y. 11691

Filed Mar. 24, 1978, Ser. No. 890,009
Int. Cl.[2] G01R *1/00*
U.S. Cl. 339—36 **8 Claims**



1. A tamper-proof adaptor for an electric meter of the type normally having contact prongs extending from the rear of the meter for insertion into a wall pan to measure electric current flowing therethrough, comprising:

(a) a housing having a wall with openings therein:

(b) a plurality of extension prongs, equal in number to the number of contact prongs of the meter, supported within the housing;

(c) each of said extension prongs having a socket at one end adapted to receive a separate contact prong of the meter,

the opposite ends of each of said extension prongs projecting through an opening in said housing wall and adapted to be received in a separate socket of a wall pan to provide electrical contact between said meter and said pan;

(d) electrical insulator means supported within the housing and disposed for movement from a non-blocking position to a blocking position between said extension and meter prongs;

(e) bias means operatively connected to said insulator means to move said insulator means to its blocking position when said extension prongs become disengaged from the meter prongs to prevent the engagement thereof and;

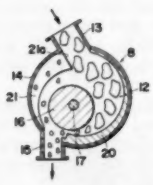
(f) said extension prongs being slideably supported within the housing for movement in a plane intersecting the path of movement of said insulator means, and being positioned to restrain movement of said insulator means to its blocking position when said prongs are engaged with the meter prongs, said extension prongs disengaging from the meter prongs when a force is exerted to disconnect said adaptor from the wall pan thereby to move said extension prongs out of the path of travel of said insulator means and permit movement of said insulator means to its blocking position by said bias means.

4,175,814

CRUSHER FOR SOLID MATERIALS TRANSPORTED BY PRESSURIZED LIQUID

Masahiro Ozasa, Tokorozawa; Kenya Murayama, Kawagoe, and Masako Okumura, Osaka, all of Japan, assignors to Ohbayashi-Gumi Co., Ltd. and KYC Machine Industry Co., both of, Japan

Filed Apr. 3, 1978, Ser. No. 892,674
Int. Cl.[2] B02C *23/36*
U.S. Cl. 241—46 R **4 Claims**



1. A crusher for crushing relatively large solid blocks carried by a pressurized liquid comprising:

a laterally extending stationary cylindrical housing having an inflow port and an outflow port, said inflow port being provided at the upper portion of said housing through which the relatively large solid blocks are fed with the pressurized fluid, said outflow port being provided at the lower portion of said housing through which the crushed solid particles are discharged into a transportation pipe, and

a cylindrical rotor eccentrically rotatable inside said cylindrical housing, said cylindrical rotor and housing defining a crushing passage therebetween, said crushing passage becoming narrower toward said outflow port,

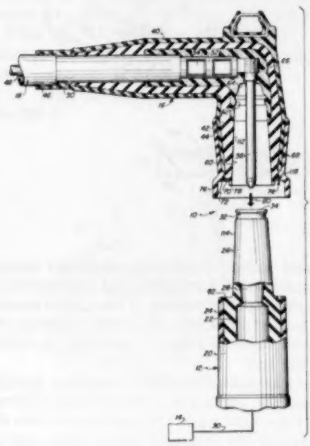
said inflow port being tangentially inclined relative to the cylindrical side wall of said housing and directed to the upper part of said crushing passage whereby the relatively large solid blocks and the pressurized liquid will be fed together into said crushing passage in the direction in which said cylindrical rotor rotates.

4,175,815

CONNECTOR ELEMENT WITH MEANS FOR REDUCING EFFECTS OF RADIAL VOID IN ELECTRICAL CONNECTION

Charles E. Andersen, and Craig W. Simons, both of Hackettstown, N.J., assignors to Amerace Corporation, New York, N.Y.

Filed May 31, 1978, Ser. No. 911,157
Int. Cl.[2] H01R *13/52, 15/06*
U.S. Cl. 339—61 R **7 Claims**



1. A first high voltage electrical connector element, such as a connector elbow, which is to be connected to a second high voltage electrical connector element, such as a bushing in a power distribution system, the first and second connector elements including first and second axially-extending interengageable surfaces, respectively, and first and second radially-extending surfaces, respectively, which will confront one another upon interengagement of the interengageable surfaces:

said first connector element including a housing member including at least a first part of insulating material, at least a portion of the first radially-extending surface provided by the first part; and

an annular lip of insulating material integral with the first part of the housing member and extending axially beyond at least said portion of the first radially-extending surface, the lip intersecting the radially innermost portion of the first radially-extending surface at all circumferential locations thereof, the lip being flexible such that upon completion of the interengagement of the interengageable surfaces the lip will be flexed outwardly so as to extend radially between the confronting first and second radially-extending surfaces and at least partially fill any gap which would otherwise be therebetween.

4,175,816

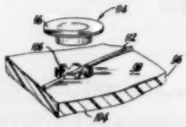
MULTI-WIRE ELECTRICAL INTERCONNECTING MEMBER HAVING A MULTI-WIRE MATRIX OF INSULATED WIRES MECHANICALLY TERMINATED THEREON

Robert P. Burr, Huntington; Ronald Morino, Sea Cliff, and Raymond J. Keogh, Huntington, all of N.Y., assignors to Kollmorgen Technologies Corporation, Dallas, Tex.

Division of Ser. No. 762,118, Jan. 24, 1977, Pat. No. 4,094,572, which is a continuation of Ser. No. 604,204, Aug. 13, 1975, Pat. No. 4,065,850. This application Mar. 31, 1978, Ser. No. 892,199
Int. Cl.[2] H01R *5/06*
U.S. Cl. 339—95 R **9 Claims**

1. A multi-hole, multi-wire electrical interconnection circuit board member comprising:

a multi-wire matrix including insulated wire; and
wire-retaining members;
said wire retaining member includes first and second conductive members mounted in the holes of the circuit board;
each of said first conductive members having a flange which extends outwardly beyond the edge of a hole and contacts one surface of the circuit board when said first conductive member is positioned in a hole;



each of said second conductive members having a flange which extends outwardly beyond the edge of a hole contacting the opposite surface of the circuit board, a portion of said second conductive member extending through said first conductive member to provide an interference fit therewith; and
said flanges of said conductive members having slots for displacing the insulation of the insulated wires and establishing a gas-tight electrical connection with the conductive cores of the insulated wires when said conductive members are installed in the holes.

4,175,817

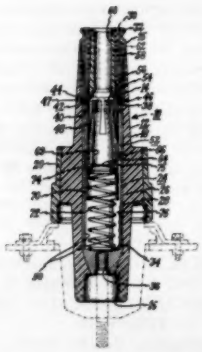
ELECTRICAL CONNECTOR SWITCHING MODULE

Henry N. Tachick, Blairstown, N.J.; Reginald S. Arnold, Pittsfield, Mass.; James E. Belcher, Dalton, Mass., and Joseph A. St. Jacques, New Ashford, Mass., assignors to General Electric Company, Philadelphia, Pa.

Continuation of Ser. No. 751,692, Dec. 17, 1976, Pat. No. 4,119,358. This application Jul. 28, 1978, Ser. No. 929,135

Int. Cl.[2] H01R *13/52*

U.S. Cl. 339—111 **9 Claims**



1. A separable electrical connector module for coupling with a mating connector module, comprising:
(a) an insulating housing having an elongated receiving passageway therein, and
(b) a switch insert closely fitted in said passageway, said insert comprising:
(i) a rigid conductive container tube having an outer end for receiving a rod contact member of the mating connector module, an inner end, an axial portion of uniform diameter;
(ii) a snuffer tube in said container tube, said snuffer tube having a central bore for receiving said rod contact member and having inside said bore a layer of ablative material;
(iii) a bore contact member adjacent said inner end of said container tube, said contact member comprising a gas port;
(iv) a piston fixed to said bore contact member and adapted for driving said contact member along the axis of said container tube toward said outer end of said container tube in response to gas generated by arcing in said bore, said piston being keyed to said container tube to prevent it from rotation in said container tube; and
(v) resiliently sliding contact member fixed to said piston and pressing outwardly against the inside wall of said container tube to establish continuous electrical contact with said inside wall while said piston is in motion:
(a) said inside wall including at least three axially extending keyribs, said keyribs being substantially equally spaced angularly about the axis of said container tube, each of said keyribs including an inner surface for electrically contacting said sliding contact member; and
(b) said sliding contact member comprising a sleeve contact fixed at one end to said piston and flared outwardly to the other end for resiliently engaging said inner surfaces of said keyribs to provide said continuous electrical contact with said inside wall while said piston is in motion.

4,175,818

ELECTRICAL CONNECTORS

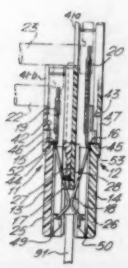
Friedrich J. A. Kourimsky, Bensheim, and Heinrich John, Rodgau, both of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 1, 1978, Ser. No. 911,723

Claims priority, application United Kingdom, Jun. 3, 1977, 23624/77

Int. Cl.[2] H05K *1/07;* **H01R** *13/42*

U.S. Cl. 339—176 MP **2 Claims**



1. An electrical connector for interconnecting wires to a printed circuit board, which comprises:
a. a first terminal of conductive material having at one end a contact portion with an intermediate curved contact surface projecting laterally outwardly and a relatively short wire connecting portion extending axially at the other end;
b. a second terminal of conductive material having at one end a contact portion with an intermediate curved contact surface projecting laterally outwardly and a relatively long wire connecting portion extending axially at the other end; and
c. first and second housing modules, releasably coupled together in back to back fashion, each module having a passageway in which the first and second terminals are respectively positioned, an aperture being located in the back walls at one end through which the terminals' inter-

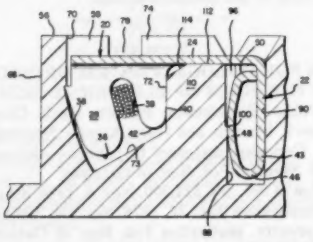
mediate curved contact surfaces project to provide in combination, a receptacle for a tab or printed circuit board, and further, wire lead out apertures in the front wall of the first module and the back wall of the second module intersecting the passageways in registration with the respective terminal's wire connecting portions, said aperture in the first module being displaced longitudinally so that the wires which may be connected to the wire connecting portions lead away from the modules in the same lateral direction without interferring with each other.

4,175,819

CONNECTING MEANS FOR CONNECTING COIL WIRES TO LEAD WIRES

Donald W. K. Hughes, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 17, 1978, Ser. No. 925,502
Int. Cl.[2] H01R *13/02*
U.S. Cl. 339—176 M **8 Claims**



1. Electrical connecting means for connecting a first wire to a second wire, said connecting means comprising:

an insulating housing having a terminal-receiving face and having first and second terminal-receiving cavities extending into said terminal-receiving face, sidewalls and endwalls surrounding said terminal-receiving face, one of said sidewalls constituting a first wire-admitting sidewall, a first wire-admitting opening in said first wire-admitting sidewall communicating with said first cavity,

first wire-supporting means in said first cavity for supporting said first wire upon placement of said first wire in said opening with its axis extending transversely across said first cavity,

a second wire-admitting opening in one of said sidewalls communicating with said second cavity, means in said second cavity for supporting said second wire upon placement of said second wire in said second wire-admitting opening,

terminal means comprising first and second contact terminals which are connected to each other by a deformable connecting neck, said second terminal being dimensioned to have a force fit in said second cavity and having contact means thereon for establishing electrical contact with a second wire disposed in said second cavity upon insertion of said second terminal into said second cavity,

said first terminal being insertable into said first cavity with accompanying bending of said connecting neck after insertion of said second terminal into said second cavity, said first terminal having a first wire-receiving portion which is dimensioned to receive and establish

electrical contact with said first wire upon movement of

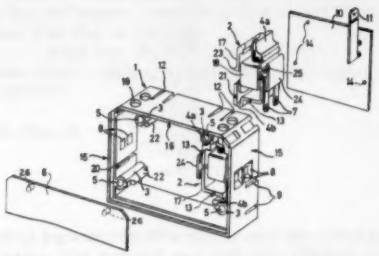
said wire-receiving portion past said first wire whereby, upon placement of said second wire in said second cavity, and insertion of said second contact terminal into said second cavity, said second wire will be placed in electrical contact with said second terminal and said terminal means will be securely held on said housing, and upon subsequent placement of said first wire in said first wire-admitting opening and in said first cavity, and upon movement of said first terminal into said first cavity with accompanying deformation of said connecting neck, said first wire will be received by said wire-receiving portion of said first terminal whereby said first wire is connected to said second wire.

4,175,820

MODULAR HOUSING MEANS FOR ELECTRICAL AND ELECTRONIC COMPONENTS

Manfred Wilmes, Detmold; Torsten Finger, Lemgo; Arno Fitzler, Herford; Wolfgang Kretzschmar, and Heinrich Franke, both of Detmold, all of Fed. Rep. of Germany, assignors to C. A. Weidmuller KG, Detmold, Fed. Rep. of Germany

Filed Oct. 17, 1977, Ser. No. 842,828
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1976, 2646616
Int. Cl.[2] H01R *9/10, 9/16*
U.S. Cl. 339—198 R **9 Claims**



1. A housing for electrical and electronic components, comprising a generally prismatic frame-like housing member having two parallel major faces of which at least one is open, and a plurality of minor faces defined by walls extending between said major faces, at least one said wall containing at least one aperture providing access to the internal space of the housing member, the housing member being provided internally with at least one pair of parallel, generally cylindrical locating ribs each extending internally along a said wall and substantially perpendicular to said major faces for locating releasably in plug-in manner at least one terminal unit for connecting external leads to a said component or components when housed in said housing, said terminal unit comprising an electrically insulating body and at least one terminal housing therein, said insulating body and at least one terminal housing therein, said insulating body being shaped to cooperate slidably with said pair of ribs, for locating said terminal unit in said housing member, said terminal unit being releasably engageable with and disengageable from the locating ribs in plug-in manner by movement of said terminal unit through said at least one open major face, and in the engaged position thereof serving to locate said at least one terminal in alignment with a said aperture, for access of at least one external conductor to said at least one terminal.

4,175,821

ELECTRICAL CONNECTOR

Bradley L. Hunter, Hollis, N.H., assignor to Teradyne, Inc., Boston, Mass.

Filed May 15, 1978, Ser. No. 905,959
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—258 R **1 Claim**

1. An electrical socket contact for conductively engaging a post, said contact comprising:

a base including

a first end portion for connection with an electrical circuit and

a second end portion spaced longitudinally from said first

end portion and separated into a plurality of transversely spaced arms,

at least one of said arms being curved transversely and

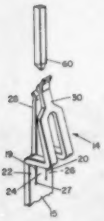
at least one of said arms being bent outwardly from said base such that at least two arms overlap each other, the outward direction being perpendicular to the transverse and longitudinal directions; and

a socket portion adjoining said second end portion of said base and including a pair of generally longitudinally extending beams,

said beams each being cantilevered from at least one of said overlapping arms,

said beams being outwardly spaced apart and transversely aligned,

said beams including contact portions near their unsupported ends for conductively engaging said post, and



said beams and arms having sufficient outward springiness to springily grip said post between said contact portions; wherein

said second end portion of said base is separated into three arms,

the two transversely outside arms are bent outwardly from said base and curved transversely toward each other so as to join at a junction and overlap the third arm positioned centrally between them, and

one of said beams extends from said junction between said two curved arms; and wherein

said arms, beams and base are integral and

the aperture defined inside the two joined outside arms corresponds in shape to the third arm and cantilevered beam extending from it,

whereby a U-shaped cut made longitudinally in said contact produces inside the U-shape the third arm and beam and outside the U-shape the two joined arms and beam.

4,175,822

AXIAL CONNECTION TERMINAL

Jean Debaigt, Maisons Laffitte, France, assignor to CGEE Alsthom, Levallois Perret, France

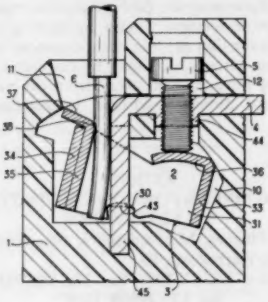
Filed Oct. 11, 1978, Ser. No. 950,348

Claims priority, application France, Oct. 26, 1977, 77 322541

Int. Cl.[2] H01R *9/10*

U.S. Cl. 339—266 R **8 Claims**

1. An axial connection terminal for receiving a conductor wire, said connection terminal comprising: firstly a wire-clamping cage, said cage comprising a metal sheet folded in the form of a sleeve of rectangular cross-section formed by two opposite end walls and by two opposite side walls, a first end wall which includes at its upper edge a first rounded extension with a concave part turned inwards against the upper edges of the side walls, said side walls including respectively notches at the center of their lower edges; and secondly a connection strip having at one end a folded-down portion, said folded down portion having an end portion widened and limited by shoulders, said folded down portion being disposed between the side walls of the wire-clamping cage and each shoulder being disposed to press against one of the notches, a clamping screw threaded through said connection strip and bearing on said first rounded extension, said notches pivoting against said shoulders by the action of the end of said clamping screw which bears against said first extension, and said conductor



wire being clamped between the second end wall and the folded portion of the connection strip.

4,175,823

PROCESS FOR HOLOGRAPHIC RECORDING OF DATA IN THE FORM OF ELECTRICAL SIGNALS

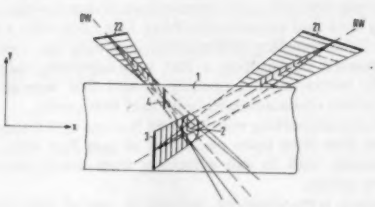
Dietlind Pekau, Taufkirchen; Hartwig Ruell, Otterfing; Eckhard Storck, Munich, and Horst Kiemle, Neuried, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Continuation of Ser. No. 521,390, Nov. 6, 1974, abandoned. This application Jun. 29, 1976, Ser. No. 700,839

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1973, 2355683

Int. Cl.[2] G02B *27/00*

U.S. Cl. 350—3.79 **1 Claim**



1. In a process of holographically recording information on a moving light-sensitive storage medium including projecting a reference wave and an object wave which is pulse modulated with the information to be recorded onto the moving storage medium to record a hologram thereon, the improvements comprising splitting the object wave into a plurality of parallel beams; separately pulse modulating each of the plurality of parallel beams with bits of information to be recorded to produce an object wave with a plurality of pulse modulated beams; focusing the object wave with the bits of information in parallel; focusing the reference wave, said steps of focusing of the object wave and reference wave producing astigmatic object and reference waves respectively with horizontal focal lines of each of said wave extending substantially parallel to the direction of feed and vertical focal lines of each wave extending perpendicular to the direction of feed, said steps of focusing adjusting the positions of the focal lines of the waves with the horizontal focal lines being disposed on one side of the storage medium and substantially in a plane extending parallel to the storage medium and the vertical focal lines being mirror symmetrical to the storage plane and closer to the storage plane than said horizontal focal lines so that the holograms, which have parallel stored bits, are recorded on the medium and are Fourier invariant at right angles to the direction of feed; and controlling the rate of feed of the storage medium so that the

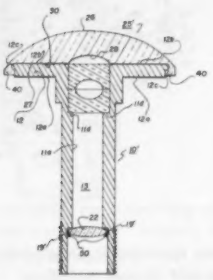
holograms partially overlap in the direction of feed of the storage medium.

4,175,824

DOOR VIEWER WITH BARREL FLANGE AND MATING LENS RECESS

Nicholas G. Daley, 1316 Cavalier, Suite 412, Richardson, Tex. 75080

Filed Sep. 13, 1977, Ser. No. 832,976
Int. Cl.[2] G02B *23/00*
U.S. Cl. 350—8 **1 Claim**



1. A door viewer, comprising:

(a) a generally cylindrical shaped barrel having an interior wall defining an axially extending elongated bore, said barrel terminating at its forward end in a generally circular shaped flange,

(b) first lens means retained within the forward end of said bore, and second lens means retained within said bore and axially spaced from said first lens means,

(c) said flange having a substantially flat forward surface, and

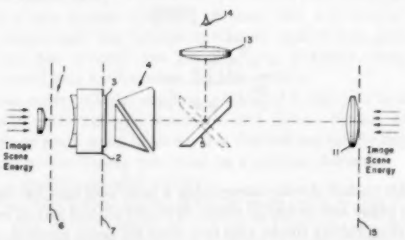
(d) a wide angle viewing lens secured to the flat surface of, and removably coupled with, said flange, said wide angle viewing lens having an outside diameter at least equal to the outside diameter of said flange and further having a centrally disposed recess in the base portion thereof for mateable reception of said flange, the circumferential end portion of said wide angle viewing lens resiliently engaging said flange.

4,175,825

OPTICAL TRANSMISSION SYSTEM WITH A PECHAN PRISM FOR EQUALIZING OPTICAL PATHS

Alfred H. Koppensteiner, Torrance, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 6, 1978, Ser. No. 883,563
Int. Cl.[2] G02B *23/12, 23/02*
U.S. Cl. 350—34 **10 Claims**



3. An optical coupling arrangement comprising:

viewing optics;

first and second imaging optics having respective focal planes occurring at different distances from said viewing optics;

a pivoted mirror disposed between said viewing optics and said first and second imaging optics, said mirror having first and second positions, said mirror in said first position reflecting a first image scene from said first imaging optics to said viewing optics, said mirror in said second position reflecting a second image scene from said second imaging optics to said viewing optics; and

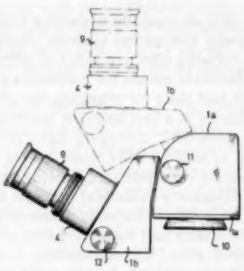
a Pechan prism disposed between said mirror and one of said first and second imaging optics and having an air equivalent optical path so as to equalize the length of the optical paths from said viewing optics to said respective focal planes of said first and second imaging optics.

4,175,826

ADJUSTABLE VIEWING HEAD FOR A STEREOSCOPIC MICROSCOPE

Erich Blaha, Essingen, and Kurt Schulz, Oberkochen, both of Fed. Rep. of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Fed. Rep. of Germany

Filed Nov. 29, 1977, Ser. No. 855,673
Claims priority, application Fed. Rep. of Germany, Dec. 3, 1976, 2654778
Int. Cl.[2] G02B *21/22*
U.S. Cl. 350—36 **2 Claims**



1. As an article of manufacture, a binocular viewing head for a stereoscopic microscope, said head comprising a first housing having a ray-inlet side adapted to be mounted to a microscope body and adapted to accommodate two laterally spaced stereoscopically related inlet-ray bundles, said bundles being on axes defining an inlet plane, a second housing having a ray-outlet side and adapted to mount binocular viewing elements on spaced parallel axes defining an outlet plane, said housings being pivotally interconnected on an axis parallel to the geometrical intersection of said inlet and outlet planes, the range of pivotal relative movement of said housings being less than 180°, and a single plane-surface mirror contained within at least one of said housings at the region of their pivotal connection of said housings and including mechanical tilt-stabilizing and angle-dividing connections to both housings, said mirror being of such effective area proportions as to accept incidence of both inlet-ray bundles within said first housing and to reflect said bundles alike within said second housing regardless of the instantaneous angular pivoted relation between said housings, said second housing including optical means accepting both reflected ray bundles and transmitting the same with equal path length and in spaced relation for binocular viewing on the respective axes of said outlet side; like binocular-viewing elements mounted to said second housing, each binocular-viewing element comprising an axis-offsetting arm mounted to said second housing for adjustable rotation about one of said spaced parallel axes of the outlet plane, like folding mirrors on each of the spaced parallel axes of the outlet plane, said mirrors being adjustably mounted to permit precision parallel alignment of said axes for said binocular viewing elements, and a single control member carried by said second housing and connected

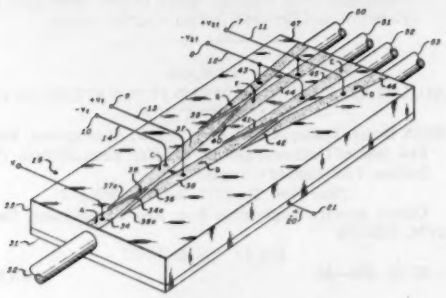
to said axis-offsetting arms for counter-rotating adjustment actuation thereof.

4,175,827

ELECTRO-OPTICAL MULTIPLEXER HAVING MULTIPLE FREQUENCY RESONANT EXCITATION

Donald H. McMahon, Carlisle, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 21, 1978, Ser. No. 879,309
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.14 **20 Claims**



1. Switchable optical coupling apparatus comprising:
a plate of optically transparent material characterized by an electrically variable effective index of refraction,
first isolated electrode means for establishing a first electric field through said plate for changing the effective index of refraction thereof at a first location, thereby establishing a first pair of selectable diverging light paths within said plate normal to said variable electric field,
said first isolated electrode means being excited by a fundamental frequency sinusoidal voltage, and
second and third isolated electrode means disposed in cooperative relation with said respective first pair of selectable diverging light paths for establishing second and third electric fields through said plate for changing the effective index of refraction thereof at respective second and third locations spaced from said first location, thereby establishing second and third pairs of selectable diverging light paths within said plate respectively normal to said second and third variable electric fields,
said second and third isolated electrode means being excited by a frequency that is harmonic of said fundamental frequency sinusoidal voltage,
said fundamental and harmonic sinusoidal frequency voltages being phased in a predetermined manner whereby discrete ones of said second and third pairs of selectable diverging light paths are selected.

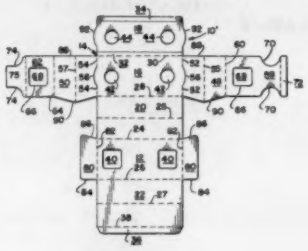
4,175,828

COLLAPSIBLE STEREOSCOPIC VIEWER

Robert G. Carver, Ashland, Ohio, assignor to Creative Cartons of Ashland, Inc., Ashland, Ohio

Filed May 11, 1978, Ser. No. 904,857
Int. Cl.[2] G02B 27/22
U.S. Cl. 350—140 **21 Claims**

1. A collapsible stereoscopic viewer for viewing photographic slides, said viewer comprising:
(a) a front wall having a pair of light-admitting openings therein;
(b) a reinforced rear wall assembly having a pair of viewing apertures therein with optical axes coincident with said light-admitting openings;
(c) a pair of magnification lenses disposed in said apertures;
(d) a top wall contiguous with both of said front wall and said rear wall assembly along a pair of spaced, transverse fold lines;
(e) a bottom wall contiguous with said front wall along a transverse fold line and adhered to said rear wall assembly;
(f) a pair of opposing side walls contiguous with said rear wall assembly along a pair of spaced longitudinal fold lines;
(g) a pair of glue flaps contiguous with said front wall along a pair of spaced longitudinal fold lines, said glue flaps being adhered to portions of said side walls; and,



(h) a film strip receiving channel outwardly proximate said front wall, said channel including:
(i) a channel wall comprised of a pair of continuous extensions of said side walls in partially overlapping engagement;
(ii) a pair of light-admitting openings in said channel wall coincident with said optical axes; and,
(iii) light-diffusing elements disposed in each of said openings in said channel wall.

4,175,829

3-DIMENSIONAL CAMERA DEVICE

Alvin M. Marks, 166-35 9th Ave., Whitestone, and Mortimer Marks, 166-25 Cryders La., Beechhurst, both of N.Y. 11357

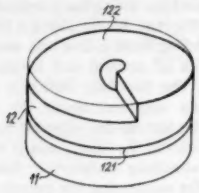
Division of Ser. No. 516,676, Oct. 21, 1974, Pat. No. 3,990,087.
This application Oct. 22, 1976, Ser. No. 734,976
Int. Cl.[2] G02B 27/26
U.S. Cl. 350—132 **2 Claims**

2. An optical device comprising a lens, said lens having an object plane and an image plane, first and second sets of mutually extinguishing filters, said first filter set being positioned on one side of the said lens, and said second filter set being positioned on the other side of said lens, said first filter set being positioned between said object plane and said lens, and said second filter set being positioned between said image plane and said lens.

4,175,830
WAVE MODE CONVERTER

Georges R. P. Marie, 17, Avenue Raymond Croland, Fontenay-aux-Roses, France (92260)

Filed Dec. 22, 1977, Ser. No. 863,235
Claims priority, application France, Dec. 23, 1976, 76 38960
Int. Cl.[2] G02B 5/00
U.S. Cl. 350—157 13 Claims

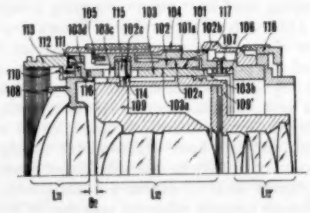


1. A wave mode converter for converting an electromagnetic, light and infrared wave into an outgoing wave having a mode confining the particles of a plasma from a target material, comprising means for converting said incoming wave into a circular polarized wave beam, means for phase shifting with respect to time at any given point of the beam said circular polarized wave beam proportionally to the azimuth of said given point around the axis of propagation of the beam, means for focusing the phase shifted outgoing wave beam on to said target material and a generator of a d.c. magnetic field directed along said outgoing beam.

4,175,831
PHOTOGRAPHIC LENS ASSEMBLY

Masaharu Ito, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 644,318, Dec. 24, 1975, abandoned.
This application Oct. 25, 1977, Ser. No. 844,839
Claims priority, application Japan, Dec. 28, 1974, 50-2496
Int. Cl.[2] G02B 7/02
U.S. Cl. 350—255 13 Claims



9. A lens assembly for use with a camera body, comprising:

(A) a lens system including at least first and second lens groups, said lens system having an optical axis, and said first and second lens groups being shiftable along the optical axis for focusing the lens system;

(B) an outer cylinder adapted to be fixed to the camera body, said outer cylinder having a first helical thread with a given pitch on an inner surface thereof and axially regulating means fixedly provided on a portion thereof;

(C) a middle cylinder having:

a second helical thread with the same pitch as that of said first helical thread of the outer cylinder, said second helical thread being provided on an outer surface of the middle cylinder;

a third helical thread, said third helical thread being provided on an inner surface of the middle cylinder; and

a right circular cylindrical groove on the inner surface of the middle cylinder, said groove terminating radially before reaching the outer surface and extending about the optical axis;

said first helical thread of the outer cylinder being engaged with said second helical thread;

said middle cylinder being operatively coupled with said outer cylinder through the thread engagement of the second helical thread thereof with the first helical thread of the outer cylinder and movable along the optical axis relative to the outer cylinder according to the pitch of the second helical thread by its own rotation around the optical axis relative to the outer cylinder;

(D) an inner cylinder having a fourth helical thread on an outer surface thereof with the same pitch as that of said third helical thread of the middle cylinder and a guide slot substantially parallel to the optical axis, said third helical thread of the middle cylinder being engaged with said fourth helical thread, said inner cylinder being movable along the optical axis in response to rotation of the middle cylinder while being prevented from rotation around the optical axis by said axially regulating means of said outer cylinder;

said first lens group being fixedly connected with said inner cylinder and shifted along the optical axis by the axial movement of the inner cylinder when said middle cylinder is rotated around the optical axis; and

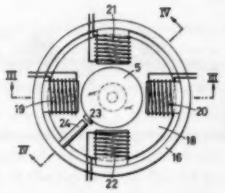
(E) connecting means for operatively connecting said second lens group with said middle cylinder, said connecting means being fixedly connected with the second lens group and engaging with said groove of the middle cylinder while projecting through said guide slot of the inner cylinder;

said second lens group being guided along the optical axis by said guide slot of the inner cylinder and shifted along the optical axis by the axial movement of said middle cylinder through engagement of said connecting means with said groove of the middle cylinder when the middle cylinder is rotated; said connecting means transmitting axial movement of said middle cylinder to move said second lens group along the optical axis without causing rotation so that said first lens group is actuated with the help of the combined pitch of said second and third helical threads while said second lens group is actuated with the help of only the pitch of the second helical thread.

4,175,832
TWO-AXIS MIRROR CONTROL APPARATUS

Nobutomo Umeki, Yokohama, and Mikio Sugiki, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 24, 1978, Ser. No. 881,118
Claims priority, application Japan, Mar. 4, 1977, 52/23556
Int. Cl.[2] G02B 27/17
U.S. Cl. 350—285 11 Claims



1. Control apparatus for allowing pivotal movement of a mirror in two directions and preventing rotation thereof in a third direction, said apparatus comprising:

a mirror;

a support member comprising a substantially pointed end against which said mirror is held and about which said mirror can pivot in two directions;

first magnetic means affixed to said mirror to pivot therewith; and

second magnetic means rigidly attached to said support member and spaced from said first magnetic means and polarized with respect to said first magnetic means to provide an interlocking magnetic field attracting said first magnetic means to urge said mirror toward said support and to prevent said mirror from rotating in a third direction on said support member.

4,175,833

ELECTRICALLY CONTROLLABLE OUTER REARVIEW MIRROR FOR VEHICLES

Yorck Talbot, Ebersstr. 80, D-1000 Berlin 62, Fed. Rep. of Germany

Filed Aug. 9, 1977, Ser. No. 823,525

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1976, 2637555

Int. Cl.[2] G02B 5/08

U.S. Cl. 350—289 **16 Claims**

1. In a remotely controlled, electrically operable outer rearview mirror for a vehicle, a combination comprising a cut-shaped housing having one end open; a mounting support connected to the other end of said housing to fix the latter to the vehicle; a removable cup-shaped insert matching an inner wall portion of said housing and defining an open side coinciding with the open end of said housing; a mirror assembly including an angularly adjustable mirror carrier for supporting a mirror and electrically controllable driving means for said carrier; means for connecting said mirror assembly to said insert; and fastening means for detachably connecting said insert together with said mirror assembly to said housing.

4,175,834

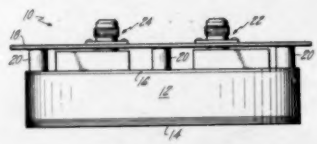
LASER MIRROR WITH COOLANT FLUID TRANSFER MANIFOLD

Warren R. Sigman, North Palm Beach, and Robert K. Stalcup, Palm Beach Gardens, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 24, 1978, Ser. No. 899,626

Int. Cl.[2] G02B 7/18

U.S. Cl. 350—310 **13 Claims**



1. A fluid transfer manifold adapted for isolating a mirror, adapted for being cooled with a coolant flowing therethrough, from hydraulic pressure loads resulting from the coolant flowing therethrough comprises:

a housing having a first passage, a second passage adapted for communicating with a heat exchanger distribution system within the mirror, a third passage internal to the housing connecting the first and second passages and adapted for passing coolant therebetween, means for attaching the housing to the mirror, a protrusion extending from a bottom surface of the housing and having the second passage passing therethrough said protrusion adapted for a slip fit engagement with the mirror for passing coolant therethrough, and means for venting the first passage to the atmosphere; and

an interface fitting adapted for a slip fit engagement within the housing and for partial insertion into the first passage wherein the interface fitting has a cylindrical body with a bore centrally located therein along a longitudinal axis of the body extending from a first end adapted for connection to a source of coolant and terminating short of a second end of the interface fitting, a plurality of slots circumferentially disposed about the cylindrical body proximate to the second end adapted for passing coolant between the bore and the third passage within the housing and means for attaching the interface fitting to a mounting plate adapted for supporting the mirror.

4,175,835

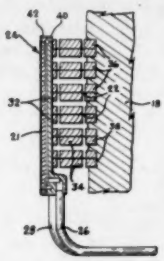
FLOATING HEAD LASER MIRROR ASSEMBLY

Ralph F. Kuhn, Jr., Calabasas, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 20, 1978, Ser. No. 926,358

Int. Cl.[2] G02B 7/18

U.S. Cl. 350—310 **9 Claims**



1. A floating head laser mirror assembly comprising a base structure, a mirror head, a plurality of flexure elements, each of said flexure elements being operably connected between said mirror head and said base structure for supporting said mirror head with respect to said base structure in a floating relationship and at least one of said flexure elements having at least one post in direct contact therewith and located between said mirror head and said base structure, for adding a predetermined amount of rigidity to said one flexure element, said post being positioned so as to expose a predetermined portion of said one flexure element whereby said mirror head is capable of expanding in the radial direction during a wide temperature variance between said mirror head and said base structure.

4,175,836

METHOD AND APPARATUS FOR FORMING VISIBLE IMAGES

Michael J. Redman, Datchworth, and David W. Satchell, Welwyn Garden City, both of England, assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 4, 1977, Ser. No. 784,492

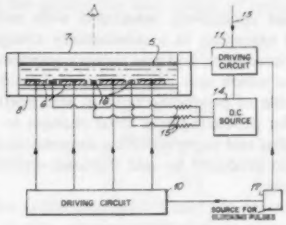
Claims priority, application United Kingdom, Aug. 31, 1976, 36057/76

Int. Cl.[2] G02F 1/17

U.S. Cl. 350—357 **4 Claims**

1. Apparatus for causing coloration of an electrochromic material comprising an electrochromic cell structure which comprises spaced electrodes with said electrochromic material sandwiched between and in contact with said electrodes, means for passing between said electrodes an electrical pulse of

a predetermined polarity, for a minimum time of 200 microseconds, which causes coloration at a potential above a coloration threshold potential for the material, and means for simultaneously applying to said material a D.C. potential of said pre-



determined polarity and of magnitude less than said threshold potential, wherein said means for applying the D.C. potential comprises electrode means separate from said spaced electrodes.

4,175,837

ELECTROCHROMIC DISPLAY CELL

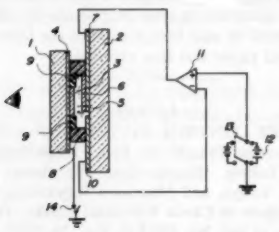
Kohzo Yano; Yasuhiko Inami, both of Tenri, and Hisashi Uede, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 15, 1978, Ser. No. 877,884

Claims priority, application Japan, Feb. 17, 1977, 52-16933

Int. Cl.[2] G02F *1/17, 1/23*

U.S. Cl. 350—357 **9 Claims**



1. An electrochromic display cell comprising two substrates defining the electrochromic display cell, a display electrode formed on one of said two substrates, an electrochromic layer formed on said display electrode, and a liquid electrolyte disposed between said two substrates, wherein

said liquid electrolyte comprises γ-Butyrolactone and lithium perchlorate, and

said electrochromic layer comprises a transition metal oxide film not soluble in said liquid electrolyte, said transition metal oxide film being formed on said display electrode under the condition where said one of the two substrates is held at a temperature between 250° C. and 400° C.

4,175,838

ELECTRO-OPTIC DEVICE

Jean-Paul Randin, Cortaillod, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

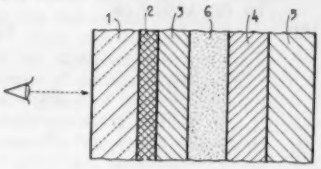
Filed Sep. 1, 1977, Ser. No. 829,798

Claims priority, application Switzerland, Sep. 14, 1976, 11631/76

Int. Cl.[2] G02F *1/17, 1/23*

U.S. Cl. 350—357 **9 Claims**

1. Electro-optic device comprising a transparent conductive layer, and electrochromic layer consisting of a transition metal oxide applied on the said transparent layer, these two first elements constituting together an electrode, a counter-electrode maintained at distance from the said first electrode, and an electrolyte ensuring an ionic connection between the electrode and the counter-electrode, characterized by the fact that the said electrolyte is polystyrene sulfonic acid containing a reductant able to form, during the operation of the device, a



redox couple with an equilibrium more anodic than the oxidation potential of the electrochromic layer, so as to prevent an increase of the potential during bleaching of the electrochromic layer that would produce the deterioration of the electrolyte.

4,175,839

SLIT-LAMP APPARATUS

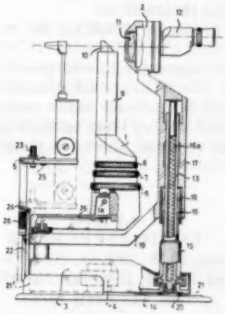
Ortwin Müller, Lorch; Karl Grunvogel, Aalen, and Kurt Schulz, Oberkochen, all of Fed. Rep. of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Fed. Rep. of Germany

Filed Oct. 18, 1977, Ser. No. 843,236

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1976, 7633232

Int. Cl.[2] A61B *3/10, 3/00, 9/00*

U.S. Cl. 351—14 **7 Claims**



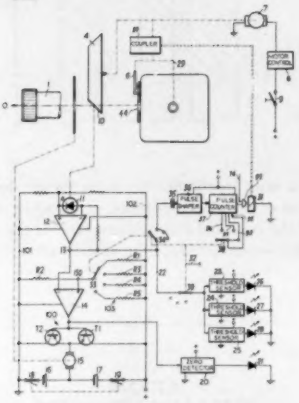
1. Slit lamp for ophthalmological examinations, consisting of a slit projector, a microscope, an instrument base, a power pack and a tonometer support, characterized by the fact that the slit projector includes a plurality of discrete slit diaphragms of different width arranged on a rotatable disc for selective placement in the ray path of the slit projector and that, in order to adjust the height of slit, a trumpet-shaped diaphgram is arranged rotatably in the ray path of the slit projector, that the microscope consists of an achromatic principal objective and a binocular straight tube of short structural length, that a guide column is fastened in the foundation plate of the instrument base, and operating elements for the horizontal and vertical movement of the slit lamp are provided coaxial to the guide column, that the power pack for the slit lamp is installed in the instrument base, and that a tonometer support which is adjustable in height is provided in the free space thus resulting between the doctor and the patient.

4,175,840

MOTION PICTURE CAMERA WITH MULTIPLE EXPOSURE

Gerd Kittag, Vienna, Austria, assignor to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed May 17, 1978, Ser. No. 906,862
Claims priority, application Austria, May 18, 1977, 3572/77
Int. Cl.[2] A03B *7/08*
U.S. Cl. 352—141 **7 Claims**



1. In a motion-picture camera provided with an objective for the illumination of successive frames of a film, a movable shutter in line with said objective, drive means for moving said shutter whereby the light path from said objective to the film is periodically blocked and unblocked, and transport means normally synchronized with said drive means for advancing the film by one frame in a blocking position of the shutter,

the combination therewith of:

photosensing means for measuring the intensity of incident light; and

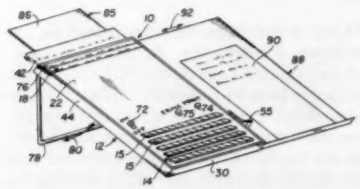
control means responsive to said photosensing means for temporarily deactivating said transport means independently of said drive means in the presence of less than a predetermined level of illumination to arrest the film and expose a given frame during a plurality of successive shutter movements.

4,175,841

PHOTO-TYPEWRITER

Gordon J. LaPorte, 60 W. 25th St., New York, N.Y. 10010

Filed Jan. 31, 1978, Ser. No. 873,851
Int. Cl.[2] B41B *13/10*
U.S. Cl. 354—5 **16 Claims**



1. A typewriter comprising

A. portable housing means,

B. a typewriter keyboard comprising a plurality of individual finger keys on said housing means and being readily engageable by the user thereof,

C. chamber means in said housing means for containing a replaceable supply of paper, said paper having an emulsion sensitive to one portion of the light spectrum as an activating agent for producing tonal changes in the emulsion, and sensitive to another portion of the light spectrum as a retarder to stop further tonal change in said emulsion, said chamber being sealed to prevent light from entering therein,

D. grid means operatively associated with said housing means and extending in a substantially straight line to produce printed lines, said grid means comprising printing filaments to which said paper is exposed, said filaments being capable of producing light in said portion of the spectrum for producing said tonal changes in the emulsion, such that said paper receiving impressions is exposed only to light produced by said filaments emitting a light glowing image,

E. coupling means electrically interconnecting said keys to said grid means so as to progressively activate said grid means across said line in response to each of the keys on said keyboard being engaged during typing,

F. said light glowing image of said grid means corresponds to the letter, numeral, or punctuation being touched on said keyboard, and the character image is then transferred photo-sensitively to the emulsion on said paper surface,

G. advancing means for moving said paper from said chamber means relative to said grid means, so as to produce line by line exposure of said paper to said grid means, such that the printed grid line is thereafter exposed to the light of said other portion of the light spectrum so as to stop said tonal change in said emulsion, such that printed typewritten lines are produced on said paper,

H. means operatively associated with said housing means for inclining same in the operative position thereof so as to facilitate use of said keyboard, and

I. means for activating said grid means in another portion of the light spectrum to erase or reverse the chemical reaction initiated by said first portion of the light spectrum to which said paper was first exposed.

4,175,842

EXPOSURE CONTROL SYSTEM FOR A CAMERA

Nobuaki Sakurada; Tadashi Ito, both of Yokohama; Nobuhiko Shinoda, Tokyo; Fumio Ito, Yokohama; Hiroyashu Murakami, Tokyo, and Masaharu Kawamura, Hino, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 660,826, Feb. 24, 1976, abandoned.
This application Jan. 4, 1978, Ser. No. 866,827
Claims priority, application Japan, Feb. 28, 1975, 50/24687; Jul. 3, 1975, 50/82270; Dec. 8, 1975, 50/146157
Int. Cl.[2] G03B *17/00*
U.S. Cl. 354—23 D **26 Claims**

3. An exposure control circuit for a camera, comprising:

(a) a single photographic information setting means for mechanically and selectively setting a shutter speed value or aperture value;

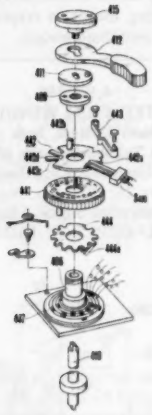
(b) single electrical signal forming means coupled to said photographic information setting means for producing an electrical signal at a common output terminal corresponding to the shutter speed or aperture value set by said photographic information setting means;

(c) a light measuring circuit for producing an electrical signal corresponding to the intensity of light;

(d) a mode selection means for selecting a shutter speed value preset mode or an aperture value preset mode;

(e) an operation circuit which is connected to said light measuring circuit and electrical signal forming means for producing an electrical signal corresponding to the shutter speed value based on a preset aperture value and intensity of light when said aperture value preset mode is selected, and producing an electrical signal corresponding to the aperture value based on a preset shutter speed value and intensity of light when said shutter speed value preset mode is selected;

(f) a shutter time control circuit for controlling a shutter time based on a supplied electrical signal;
(g) an aperture control means for controlling the aperture value based on a supplied electrical signal; and
(h) a change over means coupled to said mode selection means for connecting said output of operation circuit to



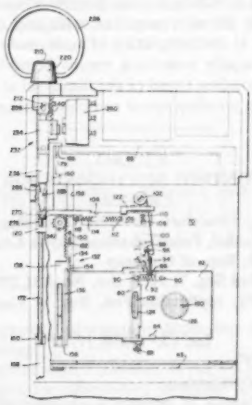
said shutter control circuit and connecting electrical signal forming means to said aperture control means when said aperture value preset mode is selected, and for connecting said output of operation circuit to said aperture control means and connecting said electrical signal forming means to said shutter control circuit when said shutter speed value preset mode is selected.

4,175,843

DUEL FOCAL PLANE PHOTOCELLS

Lawrence M. Douglas, South Easton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 4, 1978, Ser. No. 893,488
Int. Cl.[2] G03B *7/08*
U.S. Cl. 354—31 **5 Claims**



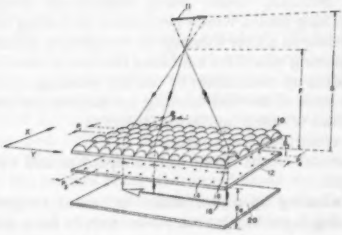
1. A camera for exposing successive portions of the same light sensitive surface of a film unit comprising:
means for exposing successive portions of a film unit including first and second objective lenses having parallel optical axes;
means for supporting a film cassette containing at least one film unit within the camera such that adjacent first and second portions of the film unit are located in alignment with and in the focal plane of said first and second lenses, respectively, during exposure of the film unit;
first and second photocells for responding to the light intensity and for participating in the determination of the extent to which the adjacent portions of the film unit are exposed;
first and second opaque means for alternatively supporting said first and second photocells directly in front of said focal plane such that the intensity of the light reaching said first and second photocells closely approximates the intensity of the light to which the second and first adjacent portions of the film unit, respectively, are subsequently exposed to, said first photocell being positionable between the first portion of the film unit and said first lens, and said second photocell being positionable between the second portion of the film unit and said second lens;
means for moving said first and second opaque supporting means between a first position, wherein said second opaque supporting means overlies the second portion of the film unit so as to prevent exposure thereof and said first opaque supporting means is located beyond the light path between said first lens and the first portion of the film unit, and a second position wherein said first opaque supporting means overlies the first portion of the film unit so as to prevent exposure thereof and said second opaque supporting means is located beyond the light path between said second lens and the second portion of the film unit; and
means for initiating an exposure cycle so as to allow the passage of scene light into the camera by way of said first and second lenses whereby when said first and second opaque supporting means are located in said first position the light passing through said first lens exposes the first portion of the film unit and the light passing through the second lens strikes said second photocell so as to control the exposure of the first portion of the film unit.

4,175,844

OPTICAL IMAGING SYSTEM

Isaia Glaser-Inbari, Tucson, Ariz., assignor to Yeda Research & Development Co. Ltd., Rehovot, Israel

Continuation-in-part of Ser. No. 733,194, Oct. 8, 1976, abandoned. This application Jul. 17, 1978, Ser. No. 925,563
Claims priority, application Israel, Oct. 19, 1975, 48318/75
Int. Cl.[2] G03B *35/00*
U.S. Cl. 354—110 **20 Claims**



1. Optical apparatus for producing a relatively large image of an object with a relatively small distance between the front of the apparatus and an image surface, comprising:
lens means for producing a plurality of images, said lens means including a surface distribution of lenslets in a predetermined arrangement disposed intermediate an object and an image surface, each of said lenslets being a size not substantially larger than the smallest size resolvable by the unaided human eye;
sampling means disposed intermediate said plurality of lenslets and said image surface for defining a plurality of discrete light transmission paths, said paths being arranged

such that each path transmits light representing a different portion of each image of said plurality of images to said image surface, whereby the sum of the contributions of each of said light paths produces a completed image on said image surface; and

image surface means for holding means for recording an image at said image surface, said image surface means being disposed as to maintain the means for recording an image at a sufficient distance from said sampling means to allow each said light transmission paths to be distributed onto an area approximately equal to the area of a single lenslet.

4,175,845

WINDING UP DEVICE OF A CAMERA

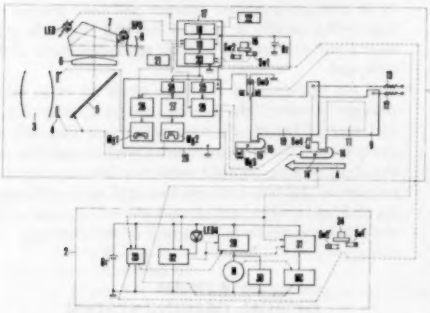
Tomonori Iwashita, Fuchu; Hiroyuki Takimoto, Urawa; Yukio Mashimo, Tokyo, and Teiji Hashimoto, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 19, 1977, Ser. No. 834,505

Claims priority, application Japan, Sep. 22, 1976, 51-114188

Int. Cl.[2] G03B *1/18, 17/42;* **F16D** *11/06*

U.S. Cl. 354—173 **12 Claims**



1. A photographic system having a film winding up device and a camera, the system comprising:

(a) said camera having a shutter means, a shutter release mechanism and a film winding up mechanism having a film wind up member, the camera including:

(1) detecting means for detecting an exposure completion signal in response to the operation of said shutter means, the detecting means being operatively coupled to switching means which performs a switching action in response to a film winding up completion signal; and

(2) inhibiting means for inhibiting the operation of the film winding up mechanism by the film winding up completion state of the film winding up mechanism; and

(b) said film winding up device including:

(1) an electric power source;

(2) terminal means operatively coupled to said switching means;

(3) a winding up motor which is caused to produce a driving force by electric power supply from said electric power source;

(4) driving force transmitting means being provided with connecting means for connection to said winding up motor and also with coupling means for coupling with a film winding up mechanism provided on the camera side;

(5) electromagnetic clutch means arranged between the winding up motor and the driving force transmitting means to transmit the driving force of the winding up motor to the driving force transmitting means;

(6) clutch switching means connected to said electromagnetic clutch means, said power source and said terminal means to form an electric power supply network for the electromagnetic clutch means, the clutch switching means being arranged to perform a switching action to cut off power supply to the electromagnetic clutch means in response to the switching action of the switching means; and

(7) motor control means connected to said power source and to said winding up motor to cut off power supply to the winding up motor immediately before the operation of said inhibiting means in response to the switching action of said switching means.

4,175,846

MOTOR-OPERATED FILM WINDING APPARATUS

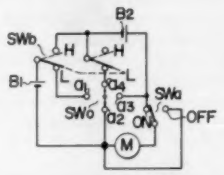
Shiyozo Nozawa; Saburo Hokari, both of Kawasaki; Shigeru Yamaga, and Akira Takahashi, both of Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed May 23, 1978, Ser. No. 908,621

Claims priority, application Japan, May 24, 1977, 52-60238

Int. Cl.[2] G03B *1/18;* **H02J** *7/00*

U.S. Cl. 354—173 **10 Claims**



1. In a motor-operated film winding apparatus for use with cameras of the type operable through a plurality of photographic cycles and having a film winding member for winding a film therearound, a motor for driving the film winding member, and a power source, for the motor-operated film winding apparatus, comprising at least two batteries and convertible into a high voltage power source and a low voltage power source by switching different numbers of batteries into circuit connection with the motor, in use, the improvement comprising:

film winding speed switching means operable to set the winding speed of the film at one of two preset speeds consisting of a high speed and a low speed, and

power supply switching means operable to switch a different battery into circuit connection with said motor, responsive to and at the completion of each photographic cycle,

said power supply switching means being operated only when the winding speed of the film is set at the low speed by said film winding speed switching means.

4,175,847

SHUTTER-CONTROL MECHANISM FOR BELLOWS CAMERA

Goetz Schrader, Frankfurt am Main, Fed. Rep. of Germany, assignor to Plaubel, Feinmechanik & Optik GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 7, 1977, Ser. No. 831,279

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1976, 2640434

Int. Cl.[2] G03B *17/04*

U.S. Cl. 354—187 **15 Claims**

1. A camera comprising:

a housing adapted to receive a photographic film to be exposed;

a lens mount provided with an objective centered on an optical axis, said lens mount being receivable in said housing in a collapsed position and being axially separable therefrom for movement into a picture-taking position;

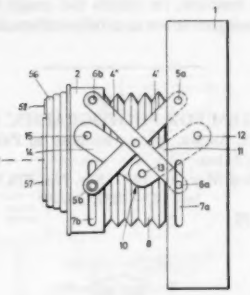
an extendible linkage interconnecting said lens mount and said housing, said linkage including a knee joint with first and second hingedly interconnected legs of equal length

having ends respectively articulated to said housing and to said lens mount;

a bellows forming a lighttight enclosure between said lens mount and said housing;

an exposure-control member on said lens mount in line with said objective;

actuating means on said housing for operating said member; and



a gear train operatively connecting said member with said actuating means, said gear train being supported on a part of said linkage, said gear train including a driving gear on the articulated end of said first leg, and driven gear on the articulated end of said second leg, a middle gear of the same size as said driving and driven gears centered on the hinge axis of said legs, and an even number of intermediate gears between said middle gear and said driving and driven gears, said intermediate gears being symmetrically disposed on said legs.

4,175,848

PHOTOGRAPHIC INFORMATION DISPLAYING APPARATUS FOR A CAMERA

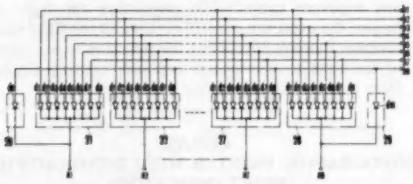
Hiroyashu Murakami, Tokyo; Tadashi Ito, Yokohama; Fumio Ito, Yokohama; Nobuaki Sakurada, Yokohama; Masaharu Kawamura, Hino, and Nobuhiko Shinoda, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 675,236, Apr. 9, 1976, abandoned. This application Jun. 2, 1978, Ser. No. 911,912

Claims priority, application Japan, Apr. 16, 1975, 50-46011

Int. Cl.[2] G03B *17/20*

U.S. Cl. 354—289 **4 Claims**



1. A photographic information displaying apparatus for a camera comprising:

(a) a first register with a plurality of digit positions for storing photographic information in digital form;

(b) timing pulse generating means;

(c) a gate means for successively providing the data stored in the first register in response to the timing pulse from the timing pulse generating means;

(d) a second register for receiving the outputs of said gate means in sequence;

(e) decoding means for decoding the content of said second register;

(f) first display means for displaying outputs of said decoding means, said first display means having a plurality of display elements each composed of a plurality of segments, at least one of said plurality of display elements having at least one segment which is not used normally at the time of displaying, said non-used segment being disconnected from the decoding means; and

(g) second display means for displaying predetermined indicia, said second display means having a segment to be connected to the decoding means, which segment operates to provide indication in response to a signal from the decoding means for controlling the non-used segment.

4,175,849

PHOTOGRAPHIC DRUM PROCESSOR INSERTS

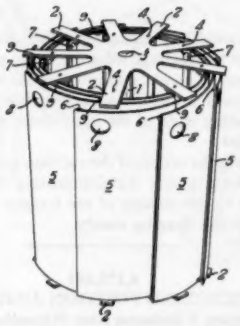
Peter R. S. Wilkinson, Chessington, England, assignor to Wilkinson Photographic Products Limited, England

Filed May 27, 1977, Ser. No. 801,252

Claims priority, application United Kingdom, May 28, 1976, 22373/76

Int. Cl.[2] G03D *3/10*

U.S. Cl. 354—329 **8 Claims**



1. A drum processor insert for use in a photographic drum processor, the insert comprising:

a frame comprising a central axially extending member, and, on each end of the member, a spider having a number of equiangularly spaced arms, a plurality of arcuate holders each adapted to hold a sheet of photographically sensitised material, each arm of each spider bearing a pivot and each holder being swingably mounted about an axis between two such pivots on oppositely facing arms, all such axes being parallel and being parallel to the straight edges of the arcuate holder, and each arm of each spider being resilient so that two opposite arms may be sprung apart to release a swingable holder held between them,

each holder being swingable from a closed position in which the frame and holders constitute a substantially cylindrical shape, the holders overlapping each other and the straight edges of the holders being distributed about the periphery of the cylinder, and an open position in which the face of each holder adapted to receive a sheet of photographically sensitised material can be reached.

4,175,850

CONTROL SYSTEM FOR A RECIPROCATING CARRIAGE DRIVE SYSTEM

David P. Bujese, Toms River, N.J., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Apr. 28, 1978, Ser. No. 901,204

Int. Cl.[2] G03G *15/00*

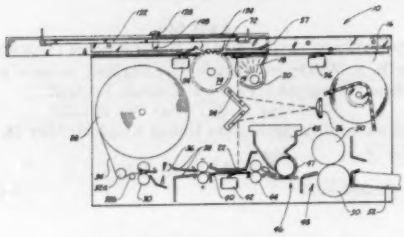
U.S. Cl. 355—13 **4 Claims**

1. In an electrophotocopy machine having illuminating means, a carriage movable from a home position for carrying a document across the illuminating means, a web of photosensi-

tive copy paper and severing means for severing copy sheets from the web for receiving an image of the illuminated document, an imaging station for imaging the illuminated document on the photosensitive copy sheet, and means for feeding the photosensitive copy sheet to the imaging station, a control system comprising:

means disposed at the imaging station for sensing the leading and trailing edges of the copy sheet; and

common controlling means responsive to the sensing means for:



A. energizing the illuminating means, initiating the movement of the carriage from the home position across the illuminating means, and enabling the severing means for subsequent actuation, all in response to the sensing of the leading edge of the copy sheet at the imaging station; and

B. initiating the return of the carriage to the home position and de-energizing the illuminating means both in response to the sensing of the trailing edge of the copy sheet at the imaging station.

4,175,851

RECORDING POSITION ADJUSTER

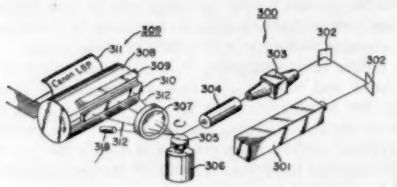
Takashi Kitamura, Yokohama; Asao Watanabe, Higashikurume; Takashi Nakano, Yokohama; Katsumi Masaki, Kodaira; Kazuhiro Hirayama, Yokohama; Yasushi Sato, Kawasaki, and Taisuke Tokiwa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 616,675, Sep. 25, 1975, Pat. No. 4,059,833. This application Sep. 9, 1977, Ser. No. 831,921

Claims priority, application Japan, Feb. 3, 1975, 50-14544; Feb. 4, 1975, 50-14530; Feb. 4, 1975, 50-14534; Feb. 13, 1975, 50-18528; Mar. 1, 1975, 50-25120

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—14 R **16 Claims**



1. A recording apparatus for providing a variable top margin comprising:

(a) beam forming means which, by application of a recording signal, forms a beam modulated by the recording signal;

(b) deflecting means which deflects the beam obtained from said beam forming means;

(c) an image forming member which, upon irradiation with the modulated and deflected beam, forms an image corresponding to the recording signal;

(d) transfer means for transferring the image on said image forming member;

(e) reference signal generating means for generating a reference signal for commencing image formation on said image forming member;

(f) timing means for measuring a certain time interval after said reference signal is generated by said reference signal forming means, wherein said timing means is adjustable to vary the time interval to be measured; and

(g) conveying means which, once the certain time interval has been measured by said timing means begins to convey a transfer member, on which the image formed on said image forming member is to be transferred, to the transfer means.

4,175,852

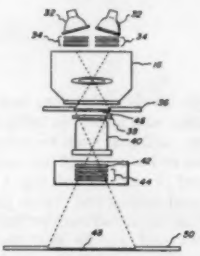
TEST SYSTEM FOR PHOTOGRAPHIC PRINTERS

Victor R. Baert, Anoka, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Mar. 11, 1977, Ser. No. 776,873

Int. Cl.[2] G03B *27/78*

U.S. Cl. 355—35 **6 Claims**



1. In a photographic printer for producing photographic prints on print paper by passing light through photographic film and exposing the print paper, the photographic printer having light source means for providing the light along a light path, filter means interposable into the light path to terminate individually exposure of the print paper in each of a plurality of color channels, shutter means having a first position in the light path for blocking light and a second position out of the light path for permitting light to expose the print paper, and exposure control means for controlling operation of the filter means and the shutter means during exposure cycles, the improvement comprising:

test switch means controllable by an operator to selectively provide a signal to the exposure control means to cause the shutter means to remain in the first position during a test exposure cycle while permitting the light source means, the exposure control means and the filter means to operate, thereby permitting the operator to test operation of the light source means, exposure control means, and filter means without exposing the print paper.

4,175,853

PHOTOGRAPHIC PRINTER WITH DICHROIC FILTER RESET INDICATORS

Ronald B. Harvey, Minneapolis, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Feb. 27, 1978, Ser. No. 881,422

Int. Cl.[2] G03B *27/78*

U.S. Cl. 355—38 **10 Claims**

1. In a photographic printer using variable exposure times, the improvement comprising:

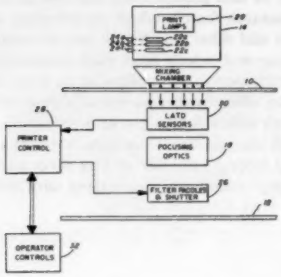
light source means for providing light for printing;

a plurality of filters movable into and out of the light to adjust the intensity of the light in a plurality of color channels;

sensing means for sensing density in each color channel of a film positioned in the path of the light, and providing sensor signals as a function of the sensed densities;

storage means for storing, for each of a plurality of setups, a signal indicative of an exposure time for each of the color channels to be used in printing a print of desired densities from a reference film associated with the setup, and sensor signal values produced when the filters are in their desired filter positions to print the print of desired densities from the reference film using the exposure time for each of the color channels;

setup select means for selecting one of the plurality of setups;



means for comparing, during re-establishing of color balance for a selected setup, the stored sensor signal values and sensor signals for the sensing means for each color channel indicative of sensed densities of the reference film then in the path of the light; and

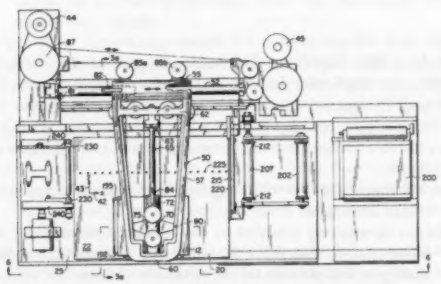
means for providing signals indicative of the direction of movement, if any, necessary to move the filters to the desired filter positions for the selected setup based upon the comparison.

4,175,854

MICROFICHE RECORDER

Stephen K. Ammann, Cupertino, and Peter E. Herborn, Menlo Park, both of Calif., assignors to Quantor Corporation, Mountain View, Calif.

Filed Feb. 1, 1978, Ser. No. 874,170
Int. Cl.[2] G03B *27/44*
U.S. Cl. 355—54 **40 Claims**



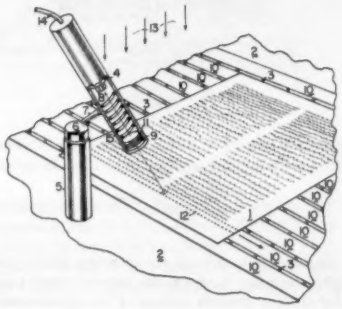
1. Apparatus for recording a multiplicity of images in a rectilinear fashion on a microfiche, the apparatus comprising: means for projecting an image into an image plane; film holding means adapted to receive a microfiche to be exposed to images generated by the projecting means; an X-carriage; means for guiding the X-carriage in an X-direction; a Y-carriage; means mounted to the X-carriage for guiding the Y-carriage in a Y-direction perpendicular to the X-direction; connector means mounting the film holding means to the Y-carriage; means for independently reciprocating the X-carriage and the Y-carriage along the respective guiding means in the X-direction and the Y-direction; and means permitting arcuate movement of the X-carriage and, therewith, of the Y-carriage and the film holding means in a Z-direction which is substantially perpendicular to the X- and Y-directions.

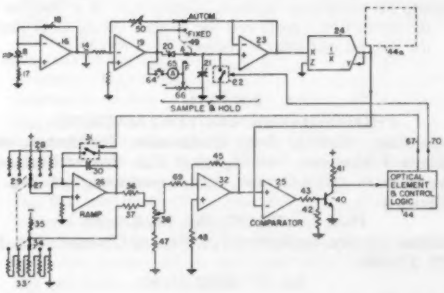
4,175,855

ELECTRONIC EXPOSURE CONTROL

William C. Turner, Northridge; William R. Limburg, Torrance, and John S. Burton, Los Angeles, all of Calif., assignors to Terminal Data Corporation, Woodland Hills, Calif.

Continuation of Ser. No. 458,167, Apr. 4, 1974, abandoned. This application Jan. 20, 1976, Ser. No. 650,642
Int. Cl.[2] G03B *27/74, 27/78*
U.S. Cl. 355—68 **15 Claims**





3. An exposure control system operative on a rapidly moving document, comprising;

(a) means to illuminate **(13)** said moving document **(1)**,

(b) optical means **(9,11)** to accept reflected said illumination from a selected portion of said moving document,

(c) photoelectric responsive means **(8)** to accept said reflected illumination from said optical means and having a selected spectral response to said reflected illumination,

(d) electronic means **(19–24)** connected to said photoelectric responsive means to provide an output

that is related to the peak magnitude of the response of said photoelectric responsive means, and

(e) an optical element **(44)** connected to said electronic means and controlled in its performance by the electrical output of said electronic means,

whereby photographic exposure by said optical element is controlled by the peak magnitude of the selected spectral characteristic of said reflected illumination.

4,175,856

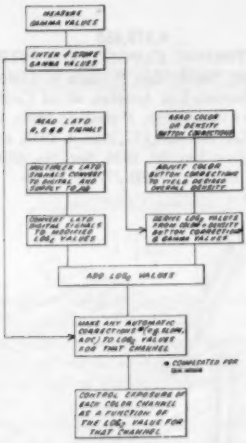
PHOTOGRAPHIC PRINTER WITH AUTOMATIC DENSITY AND COLOR CORRECTIONS FOR PAPER GAMMA

John Pone, Jr., Minneapolis, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Nov. 4, 1977, Ser. No. 848,739

Int. Cl.[2] G03B *27/78*

U.S. Cl. 355—68 **5 Claims**


MEASURE GAMMA VALUES
ENTER 6 STORE GAMMA VALUES
READ LATD R, G & B SIGNALS
READ COLOR OR DENSITY BUTTON CORRECTIONS
MULTIPLEX LATD SIGNALS CONVERT TO DIGITAL AND SUPPLY TO PIA
ADJUST COLOR BUTTON CORRECTIONS TO YIELD DESIRED OVERALL DENSITY
CONVERT LATD DIGITAL SIGNALS TO MODIFIED LOG$_E$ VALUES
DERIVE LOG$_E$ VALUES FROM COLOR & DENSITY BUTTON CORRECTION & GAMMA VALUES
ADD LOG$_E$ VALUES
MAKE ANY AUTOMATIC CORRECTIONS (E.G. FLSH, AGC) TO LOG$_E$ VALUES FOR THAT CHANNEL
COMPLETED FOR
CONTROL EXPOSURE OF EACH COLOR CHANNEL AS A FUNCTION OF THE LOG$_E$ VALUE FOR THAT CHANNEL

2. In a photographic printer for printing photographic images on a photographic medium, the improvement comprising:

means for storing gamma values of the photosensitive medium;

means for supplying correction signals indicative of desired incremental corrections in density; and

means for modifying exposure in the printer as a function of the correction signals and the gamms values to produce the desired incremental corrections in density.

4,175,857

PHOTOGRAPHIC COPYING MACHINE

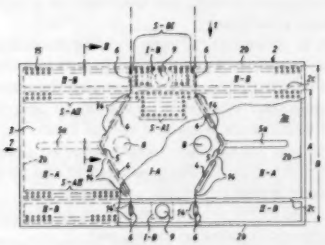
Heinz Rapp, Munich; Ernst Biedermann, Taufkirchen, and Dieter Wittenbrink, Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Jan. 18, 1978, Ser. No. 870,604

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1977, 2701943

Int. Cl.[2] G03B *27/60*

U.S. Cl. 355—73 **22 Claims**



1. Apparatus for transferring sheets from a predetermined position in a first plane into a second plane, particularly for transferring sheets into the copying plane of a photographic copying machine, comprising a suction chamber including a perforated wall having an outer side which defines said second plane and is in register with a sheet in said predetermined position; means for evacuating air from said chamber whereby air which flows into said chamber by way of perforations in said wall attracts and effects the transfer of a sheet from said first into said second plane; means for subdividing the interior of said chamber into at least two groups of sections one of which directly communicates with said evacuating means and each of which communicates with different perforations of said wall, said subdividing means including partitions separating the other of said groups from said one group and having respective passages therein which permanently and indirectly communicate said other group with said evacuating means via said one group and which have such dimensions as to offer substantial resistance to the outflow of air from said other into said one group whereby that portion of a sheet in said predetermined position which is adjacent to perforations communicating with said one group of sections is transferred into said second plane prior to transfer of that sheet portion which is adjacent to perforations communicating with said other group of sections.

4,175,858

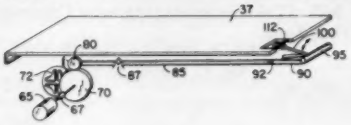
FILM DUPLICATOR

John W. Meadows, Los Altos, Calif., assignor to Quantor Corporation, Mountain View, Calif.

Filed Apr. 17, 1978, Ser. No. 897,080

Int. Cl.[2] G03B *27/04*

U.S. Cl. 355—99 **20 Claims**



1. In a film duplicator for making copies of a microfiche master, the duplicator having an exposure station, means for indexing the master at the exposure station, and means for storing a supply of copy film, the improvement comprising:

a rotatable element having camming means associated therewith;

motor means for driving the rotatable element in a predetermined direction;

means operatively coupled to the rotatable element for advancing copy film from the supply to the exposure station during a first portion of the rotatable element's rotation;

means operatively coupled to camming means of the rotatable element for severing an exposed length of copy film during a second portion of the rotatable element's rotation, the second portion being completely distinct from the first portion; and

means operatively coupled to camming means of the rotatable element for biasing the copy film in an overlying relationship into intimate contact with the master during a third portion of the rotatable element's rotation and for releasing the copy film during a fourth portion of the element's rotation;

whereby activation of the motor means causes a cyclical film transport, film severance, film biasing, and film release.

4,175,859

APPARATUS FOR AUTOMATED CLASSIFICATION OF WHITE BLOOD CELLS

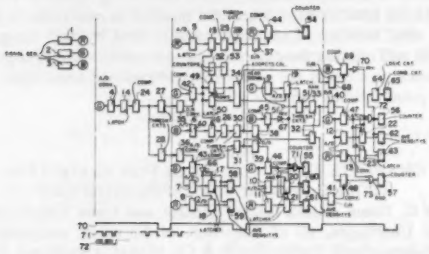
Akihide Hashizume, Hachioji; Ryuichi Suzuki, Kokubunji; Hisatake Yokouchi, Hachioji; Hideyuki Horiuchi, Kokubunji, and Shinji Yamamoto, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jul. 14, 1977, Ser. No. 815,824

Claims priority, application Japan, Jul. 23, 1976, 51-87286

Int. Cl.[2] G01N *33/16*

U.S. Cl. 356—39 5 Claims



1. An apparatus for automated classification of white blood cells, comprising:

means for generating light having components of at least one of green light, blue light and red light and for passing the light through a blood specimen;

green light converting means for converting the green light passing the blood specimen into an electric output signal;

first detecting means for detecting the maximum and minimum values of the output signal produced from said green light converting means and providing maximum and minimum value output signals;

difference means for detecting the difference between the maximum and minimum value output signals provided from said first detecting means and producing an output signal which is a predetermined percentage of said detected difference;

second detecting means for detecting the output signal of said green light converting means greater than the output signal of said difference means and providing an output signal for indicating the zone where the nucleus of white blood cells exists;

blue light converting means for converting the blue light passing the blood specimen into an electric output signal;

maximum value means for detecting the maximum value from the output signal produced from said blue light converting means and providing a maximum value output signal;

third detecting means for detecting, from the output signal produced from said blue light converting means, the values greater than the output signal from said maximum value means;

position means by which the positions in both horizontal and vertical directions of the white blood cells in the blood specimen are detected from the output signal produced from said second detecting means and providing the output signal indicative thereof;

address calculation means controlled by the output signal from said position means and storing the output signal from said green light converting means when there exists no output signal from said third detecting means and providing an output signal; and

minimum value means for detecting the minimum value which is produced at the termination of variation of the output signal from said address calculation means and providing a minimum value signal for indicating the nucleus of the white blood cell.

4,175,860

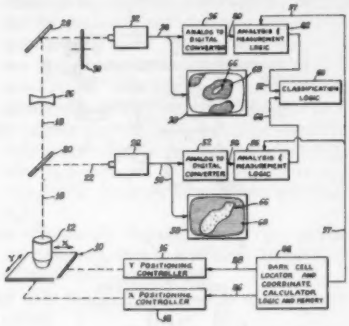
DUAL RESOLUTION METHOD AND APPARATUS FOR USE IN AUTOMATED CLASSIFICATION OF PAP SMEAR AND OTHER SAMPLES

James W. Bacus, Hinsdale, Ill., assignor to Rush-Presbyterian-St. Luke's Medical Center, Chicago, Ill.

Filed May 31, 1977, Ser. No. 801,623

Int. Cl.[2] G01N *33/16*

U.S. Cl. 356—39 7 Claims



1. A method of analyzing and automatically classifying a large number of cells in a field on a support, comprising the steps of:

prescreening the field of cells and designating the locations of objects in the field as subject cells for closer examination, bringing the subject cells into a position for a detailed analysis at a low resolution of the entire cell and at a higher resolution of an internal or nuclear portion of the cell,

producing a large field of view image at high resolution including a high resolution image of the entire cell, demagnifying the large field of view image to produce a low resolution image of said entire cell with sufficient detail to extract features relating to the total cell,

using only an internal portion of said large field of view to produce a high resolution image of substantially only the internal or nuclear portion of said subject cell and excluding substantially the remainder of the cell,

simultaneously performing measurements and analysis on said low resolution image of the entire cell and on the internal or nuclear portion high resolution image including the extracting of features relating to texture of its internal or nuclear portion,

and classifying the cells in the field based on the features extracted simultaneously from said different images having said different resolutions.

4,175,861

SYSTEM FOR THE ALIGNMENT OF A LASER BEAM TRANSMITTER WITH A SIGHTING MECHANISM SET UP IN ANOTHER PLACE

Rolf Kottas, Hamburg, Fed. Rep. of Germany, assignor to "Laser-Light" Gesellschaft mit beschrankter Haftung, Hamburg, Fed. Rep. of Germany

Filed Feb. 23, 1977, Ser. No. 770,079

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1976, 2607280

Int. Cl.[2] G01B *11/27*

U.S. Cl. 356—153 4 Claims

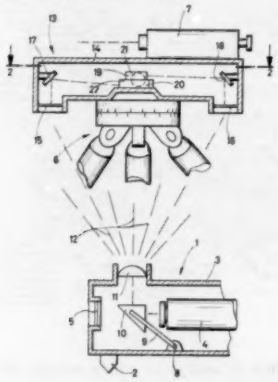
1. A system for the alignment of a laser beam generator instrument and a remotely located sighting instrument comprising:

a. a projection device mounted on one of said instruments including a laser generator (4) for generating a laser beam and a fixed optical member (11) mounted in the path of

said laser beam which projects a fan-shaped beam (12) on the longitudinal axis of said other instrument;

b. a receiving device (13) having a pair of windows fitted with ground glass screens (15) and (16) spaced along the longitudinal axis of said receiving device which form an image of axially displaced portions of said fan-shaped beam on said ground glass screens;

c. a system of optical elements (17–20) which deflect said fan-shaped beam images from each of said screens at angles which are precisely equal;



d. an eyepiece (21) positioned for the simultaneous observation of said beam images formed on said screens (15) and (16) through said optical elements (17–20); and

e. said optical system includes a five-sided prism (20) and a 90° prism (19), the axes of which are normal to the principal axes of said instruments and reflect said fan-shaped beam images received on said screens (15) and (16) via the reflectors (17) and (18) by 90°, so that relative angular movement of the principal axis of said instruments causes said fan-shaped beam images appearing on said screens (15) and (16) to move in opposite directions as viewed in said eyepiece (21).

4,175,862

ARRANGEMENT FOR SENSING THE GEOMETRIC CHARACTERISTICS OF AN OBJECT

Paul L. DiMatteo, Huntington; Joseph A. Ross, Fort Salonga, and Howard K. Stern, Greenlawn, all of N.Y., assignors to Solid Photography Inc., Melville, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,265

The portion of the term of this patent subsequent to Feb. 11, 1992, has been disclaimed.

Int. Cl.[2] G01B *11/00;* **G01C** *11/02, 11/12*

U.S. Cl. 356—375 **62 Claims**

1. A method for sensing and locating points on a surface comprising the steps of: generating a projection field directed onto a surface; subdividing said projection field into a number of sections; irradiating said surface with different variations of said subdivided projection field so that each section is illuminated at least once; recording within a field of view images of said surface as irradiated by the subdivided projection field; recording a calibrated reference surface and reading said recorded images in relation to said reference surface to define the location of a predetermined point on said first-mentioned surface and appearing within said field of view; projecting in sequence by said projection field preselected patterns onto the surface for subdividing the projection field into predetermined sections, said projected patterns on said surface having irradiated sections and non-irradiated sections, each pattern of irradiated sections and non-irradiated sections corresponding to an assigned code; said reading step comprising further reading each projected pattern of irradiated and non-irradiated sections and reading the sections in which a preselected point appears; combining said patterns for obtaining a predetermined total number of sections, said projection field being subdivided into said total number of sections, the number of said patterns and the total number of sections being related by said assigned code; and relating the patterns and sections in which the point appears to identify the position in three-dimensional space of the point on said surface.

4,175,863

GRAPHITE TUBE ATOMIZER FOR FLAMELESS ATOMIC ABSORPTION SPECTROSCOPY

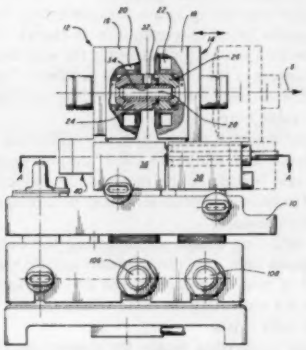
Rolf G. Tamm, Salem; Günter Grosser, and Toma Tomoff, both of Uberlingen, all of Fed. Rep. of Germany, assignors to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen, Fed. Rep. of Germany

Filed Apr. 13, 1977, Ser. No. 787,036

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1976, 2617928

Int. Cl.[2] G01J *3/30;* **H01R** *13/54, 13/62*

U.S. Cl. 356—312 **5 Claims**



1. A graphite tube atomizer for atomic absorption spectroscopy having a graphite tube disposed to permit passage of a measuring beam through the graphite tube, said atomizer comprising;

first and second housing portions,

an annular contact piece carried by each of said first and second housing portions and adapted for electrical connection to current conducting cables,

means for mounting said first housing portion for movement relative to said second housing portion,

drive means connected to said first and second housing portions for selectively moving said first portion between a first position with its contact piece in contact with one end of the graphite tube under a substantially constant predetermined bearing pressure and a second position with its contact piece spaced from the one end of the graphite tube,

said drive means including a cylinder housing carried by one of said first and second housing portions and a piston disposed in said cylinder housing and connected to the other of said first and second housing portions, and

a source of gas under pressure,

said drive means including valve means connected between

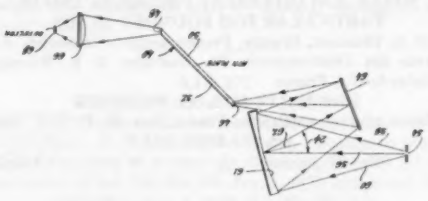
said cylinder housing and said source of pressurized gas for selectively communicating gas from said source to said cylinder housing and thereby to relatively displace said cylinder housing and said piston to move said first housing portion between said first position and said second position and maintain the contact piece carried by said first housing portion in contact with the one end of the graphite tube under a substantially constant predetermined bearing pressure when said first housing portion is in said first position.

4,175,864

ASTIGMATIC ILLUMINATING SYSTEM IN AN INTERNAL REFLECTION SPECTOMETER

Anthony C. Gilby, Darien, Conn., assignor to The Foxboro Company, Foxboro, Mass.

Filed Feb. 21, 1978, Ser. No. 879,197
Int. Cl.[2] G01J *3/42*
U.S. Cl. 356—326 **19 Claims**



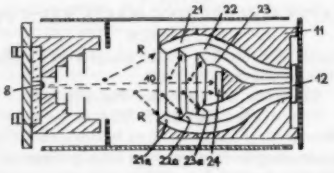
1. An internal reflection spectrometer comprising:
a light source;
means for forming first and second astigmatic images of said light source;
an internal reflectance crystal having a light-entrance end surface and a light-exit end surface, and two opposed internally reflecting surfaces extending between said end surfaces to multiply internally reflect light therebetween, said internal reflectance crystal being so positioned that one of said astigmatic images having a distorted height is formed at about said entrance end surface and the other of said astigmatic images having a distorted width is formed at about said exit end surface;
means for positioning a test sample adjacent at least one of said internally reflecting surfaces; and
means for detecting light passing through the exit end surface of said internal reflectance crystal.

4,175,865

SMOKE DETECTOR

Zoltan Horvath, Männedorf, and Erwin Tresch, Zollikon, both of Switzerland, assignors to Cerberus AG, Männedorf, Switzerland

Filed Mar. 14, 1977, Ser. No. 777,396
Claims priority, application Switzerland, Apr. 5, 1976, 4138/76
Int. Cl.[2] G01N *21/26*
U.S. Cl. 356—338 **23 Claims**



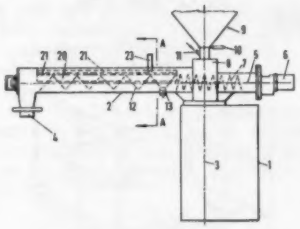
1. An optical smoke detector comprising:
a measuring chamber for receiving gases which are to be analysed for the presence of particles stemming from a combustion process;
a radiation source located in said measuring chamber for transmitting radiation through a predetermined spatial region defining a region of direct radiation;
at least one radiation receiver positioned in said measuring chamber for receiving radiation scattered by the particles located in said region of direct radiation;
a plurality of radiation-conducting elements for conducting radiation by reflection positioned in said measuring chamber for removing radiation in a substantially ring-shaped zone located about said region of direct radiation which has been scattered forwardly at an acute angle with respect to the radiation direction and for delivering such removed forwardly scattered radiation receiver; and
said radiation-conducting elements comprising substantially bulb-shaped elements possessing substantially ring-shaped inlet openings and an apex portion arranged in spaced relationship from said substantially ring-shaped inlet openings;
said substantially ring-shaped inlet openings being located at a substantially ring-shaped zone disposed about the region of the direct radiation; and
said apex portion being located adjacent said radiation receiver.

4,175,866

METHOD OF OPERATING A FOUNDRY SAND MIXING MACHINE

Albert Edwards, Bourne, England, assignor to Baker Perkins Holdings Limited, Peterborough, England

Continuation-in-part of Ser. No. 742,670, Nov. 17, 1976, abandoned. This application Apr. 10, 1978, Ser. No. 894,724
Claims priority, application United Kingdom, Nov. 26, 1975, 48553/75
Int. Cl.[2] B28C *5/00*
U.S. Cl. 366—2 **11 Claims**



1. A method of inhibiting the gross build-up of a cold-setting foundry sand mixture upon elements of a mixing machine exposed to the mixture during the process of mixing the mixture, the foundry sand mixture having a tendency to adhere to and to set upon said elements to build-up a coating on said elements; the method comprising the steps of first discharging on to said elements while the mixing machine is substantially empty a fluid inhibitor operable to prevent or retard the setting of the mixture on said elements, and subsequently introducing the mixture into the mixing machine for the mixing operation.

4,175,867

PROCESS AND APPARATUS FOR STATIC MIXING

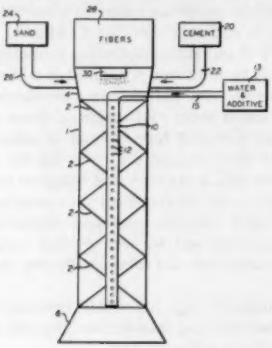
Matthew R. Piazza, Nichols, Conn., assignor to Maso-Therm Corp., Bridgeport, Conn.

Filed Mar. 1, 1978, Ser. No. 882,484
Int. Cl.[2] B01F *15/02*
U.S. Cl. 366—9 **6 Claims**

1. A static mixing apparatus comprising:

a static mixing column having a plurality of static mixing elements therein;

spraying means disposed along the length of the column and having a plurality of spraying apertures therein and receptive of liquid for spraying same through the apertures and into material to be mixed in the column to mix therewith



wherein the spraying means comprises a jacket disposed around and including inner the wall of the column and wherein the apertures are disposed in the inner wall of the column and in communication with the jacket; and

a chamber disposed at the top of the column and in communication therewith and receptive of the materials to be mixed in the column.

4,175,868

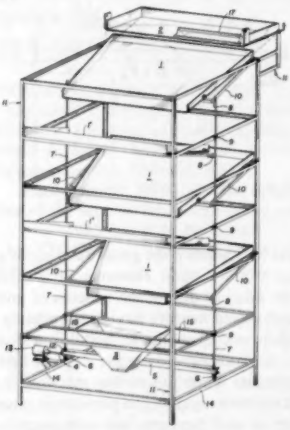
PROCESS FOR INCORPORATING REINFORCING FIBERS IN CEMENTING MATRICES, USING AN APPARATUS COMPRISING VIBRATING TRAYS

José M. Restrepo, Calle 85 No. 30 Piso 14-70, Bogotá, Colombia

Filed May 5, 1978, Ser. No. 903,207

Int. Cl.[2] B28C *5/04*

U.S. Cl. 366—9 **9 Claims**



1. A process for homogeneously incorporating fibrous reinforcing material into a matrix of pastes of cementing materials, comprising,

charging in alternating relationship into a supplying station horizontal strata of cementing material paste and horizontal uniform strata of fibrous material;

withdrawing from said supplying station a stream of cementing material paste containing a proportionate layered amount of fibrous reinforcing material;

gravity flowing under laminar flow conditions said stream along a succession of stream lengths, with each of the stream lengths flowing on respective vertically spaced apart slopes;

free-fall discharging each upper stream length from its downstream end onto the upstream end of the next succeeding stream length flowing along a corresponding lower slope;

reversing the direction of flow of each of said stream length of said succession, following each free fall discharge; and

collecting cementing material paste having fibrous reinforcing material homogeneously incorporated therein, at the end of said succession of stream lengths; wherein said stream of cementing material paste containing fibrous material is caused to flow along said succession of stream lengths in the condition of thin layer, while each of said layers is subjected to vibration.

4,175,869

MIXER FOR DIFFERENT PRODUCTS AND IN PARTICULAR FOR FOUNDRY SANDS

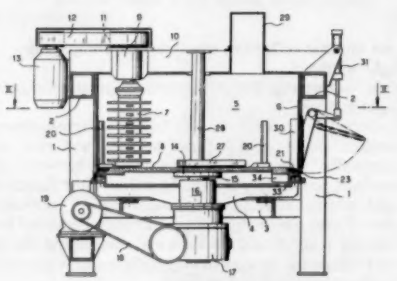
Henri A. Churlaud, Brunoy, France, assignor to Societe Anonyme des Etablissements Ph. Bonvillan & E. Ronceray, Choisy-le-Roi, France

Filed Jun. 19, 1978, Ser. No. 917,120

Claims priority, application France, Jun. 29, 1977, 77 20007

Int. Cl.[2] B01F *7/16*

U.S. Cl. 366—42 **9 Claims**



1. A mixer for foundry sands comprising:

a frame;

a mixing tank supported by said frame, said tank comprising:

a bottom member of said tank arranged to rotate in a substantially horizontal plane about a vertical axis; and

a cylindrical side wall fixed to said frame;

a turbine extending substantially vertically into said tank at a location displaced from the axis of said bottom member;

means for rotating said bottom member;

means for rotating said turbine; and

an emptying trap in said side wall of said tank, said trap being circumferentially displaced from the location of said turbine.

4,175,870

APPARATUS FOR FEEDING WASTE YARN TO AN EXTRUDER

Fred M. Warzel, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

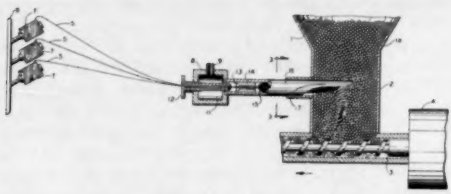
Filed Jan. 17, 1978, Ser. No. 870,156

Int. Cl.[2] B01F *7/24*

U.S. Cl. 366—76 **2 Claims**

1. An apparatus for feeding yarn into a mass of moving particles moving through a conduit or hopper, typically on their way to the screw of an extruder or into a molding machine, which comprises in combination an aspirator-jet forwarding means, means to activate said aspirator-jet forwarding means, means in combination with said jet forwarding means to

receive and to compress yarn being emitted from said jet forwarding means and means extending from said last-mentioned means into said hopper or conduit to feed wadded yarn into a mass moving through said hopper, said means for feeding the wad into said hopper or conduit being shaped as a hood or

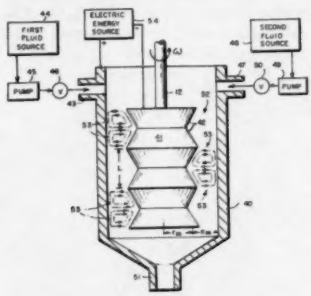


shield and being positioned to fend moving particles or other material moving in said hopper or conduit away from said wad until said wad and thus protecting said wad until it has emerged into within the mass of material moving in said hopper or conduit.

4,175,871
FLUID MIXING APPARATUS

Nam P. Suh, Sudbury; Christopher A. Rotz, Watertown, and Lewis Erwin, II, Belmont, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 584,985, Jun. 9, 1975, abandoned. This application Jan. 5, 1978, Ser. No. 867,327
Int. Cl.[2] B29B *1/04*
U.S. Cl. 366—79 **20 Claims**

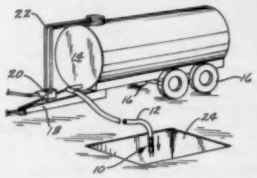


1. A laminar mixing apparatus comprising
an outer member;
an inner member concentrically mounted for rotation within said outer member;
means for introducing at least two fluids into the region between said inner and outer members;
means for providing a relative rotation between said inner and outer members;
groove means formed on the surface of said inner member, the mean gap dimension between said inner member and said outer member, the mean distance from the center of said inner member to said groove means, and the length of said groove means being selected to produce substantial vortex-like motions of said fluids in the portions of said region formed between said groove means and said outer member when said relative rotation is provided, said fluids thereby being mixed in a substantially laminar fashion by said groove means in said region, said groove means tending to prevent the interface between said fluids from becoming aligned in parallel with the streamlines of said fluids; and
means for removing the mixture of said fluids from said apparatus.

4,175,872
METHOD AND MEANS FOR AGITATING LIQUID MANURE

David R. Primus, Mt. Auburn, Iowa 52303

Filed Sep. 28, 1978, Ser. No. 946,827
Int. Cl.[2] B01F *13/06, 15/02*
U.S. Cl. 366—139 **10 Claims**

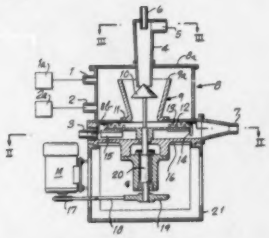


1. An adapter for a liquid manure vacuum agitator having a tank, a hose connected to said tank at one end and having a free end, and means for applying a vacuum to said hose for collecting a manure water mixture through said free end; said adapter comprising:
an elongated cylindrical tubular member having opposite ends and an internal annular bore defined by the interior cylindrical wall of said tubular member;
a continuous spiraling blade attached to said interior cylindrical wall said spiraling blade having sufficient width to extend radially inwardly from said cylindrical wall to an inner edge which is spaced from axial centerline of said tubular member, thereby leaving an open center through said tubular member along said longitudinal centerline thereof; and
means for connecting one end of said tubular member to said free end of said hose.

4,175,873
PROCESS AND APPARATUS FOR MECHANICALLY MIXING TWO IMMISCIBLE LIQUIDS AND ONE OR MORE OTHER SUBSTANCES

Hiroyuki Iwako, and Shigeki Ando, both of Tokyo, Japan, assignors to Funken Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 819,544, Jul. 27, 1977, abandoned. This application Oct. 6, 1978, Ser. No. 949,220
Claims priority, application Japan, Sep. 10, 1976, 51-107892
Int. Cl.[2] B01F *3/08, 3/12, 7/16, 13/10*
U.S. Cl. 366—165 **22 Claims**



1. A continuous flow mixer comprising:
tank means having two inlets for respectively receiving two immiscible liquids therein;
means forming an inverted truncated conical surface coaxially disposed within said tank means, and having an upper circumferential rim communicating with the interior of said tank means and a lower open end sealed from the interior of said tank means;
means for feeding two immiscible liquids into said tank means so as to overflow said rim and create a continuous

downwardly flowing dual-layer liquid film on said conical surface from said rim to the open lower end;

means for feeding a third substance into said tank means;

means for centrifugally dispersing said third substance into said flowing liquid film on said conical surface;

compartment means communicating with said lower open end for receiving the downwardly flowing dual-layer liquid film containing the third substance dispersed therein; and

means in said compartment means for producing a shearing action on the liquids and third substance therein to mix and emulsify the two immiscible liquids and the third substance dispersed therein.

13. A process for mechanically mixing two immiscible liquids and one or more other substances comprising the steps of:

feeding two immiscible liquids into a first chamber containing an inverted truncated conical surface having an upper circumferential rim communicating with the interior of said tank means and a lower open end sealed from the interior of said tank means;

causing said immiscible liquids to flow over said conical surface rim for creating a continuous downwardly flowing dual-layer liquid film on said surface from said rim to the upper lower end;

feeding a flow of a third substance into said first chamber and centrifugally dispersing said third substance into said downwardly flowing dual layer of liquid film;

receiving the downwardly flowing dual-layer liquid film containing the third substance dispersed therein in a second chamber through the open end of said truncated conical surface; and

producing a shearing action on the liquids and third substance in said second chamber to mix and emulsify the two immiscible liquids and the third substance dispersed therein.

4,175,874

HIGH PRESSURE INJECTION MIXING HEAD FOR MULTI-COMPONENT PLASTICS, PARTICULARLY POLYURETHANE

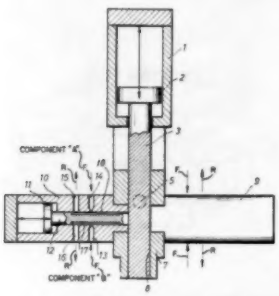
Fritz W. Schneider, Strasslach, Fed. Rep. of Germany, assignor to Elastogran Maschinenbau GmbH & Co., Munich, Fed. Rep. of Germany

Filed Aug. 11, 1977, Ser. No. 823,663

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1976, 2645937

Int. Cl.[2] B01F *15/00*

U.S. Cl. 366—182 **6 Claims**



1. A high pressure mixing and injection apparatus from which mixed multi-component plastics, particularly polyurethane, may be discharged in a stabilized jet, said apparatus including a plurality of mixing assemblies each having a cylindrical mixing chamber with in-feed and return flow port means for the several components and also having piston means slidable in the mixing chamber for controlling the flow of the components and to alternately open the port means to allow mixing of the components in the chamber and close the port means to component flow transversely across the mixing chamber while connecting in-flow and return flow port means for each component, the mixing chambers of the mixing assemblies having outlet ports, a transfer cylinder with a diameter significantly greater than the diameter of the mixing chambers, the outlet ports of the mixing chambers communicating with the transfer cylinder for unobstructed flow, an ejector piston slidably disposed in said transfer cylinder, the axes of said cylindrical mixing chambers and the piston means therein extending perpendicularly of and radially toward the axis of the transfer cylinder and said axes also being symmetrically arranged with respect to each other and in a common plane disposed with respect to the transfer cylinder so that the angles between the adjacent axes of the mixing chambers and piston means of the several mixing assemblies are of substantially equal size, and the transfer cylinder having an open end from which flow of the mixed multi-component plastics is discharged in stable jets.

4,175,875

HAND MIXING APPARATUS

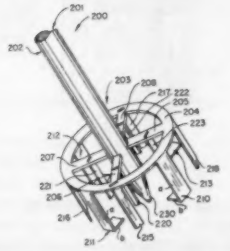
Judd Van Horbek, 575 Sheridan St., Mount Angel, Oreg. 97362

Continuation-in-part of Ser. No. 736,711, Oct. 29, 1976, Pat. No. 4,065,107. This application Dec. 9, 1977, Ser. No. 859,008

The portion of the term of this patent subsequent to Oct. 18, 1994, has been disclaimed.

Int. Cl.[2] B01F *7/16*

U.S. Cl. 366—343 **9 Claims**



1. An apparatus for mixing comprising:

a handle having an upper section and a lower section;

a pivot point terminating the lower section for providing a low-friction bearing surface to support the handle on the bottom of a container and to provide a clearance between the bottom of mixing blades attached thereto and the bottom of the container when the apparatus is being held against and rotated on the bottom;

a circular ring-shaped mixing blade;

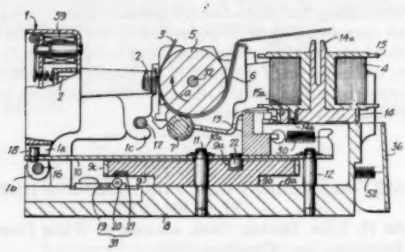
a plurality of supporting mixing blades rigidly attached to and extending radially in a plane perpendicular to the axis of the handle from the lower section of the handle to the interior edge of the ring-shaped mixing blade for supporting the ring-shaped mixing blade concentrically about the lower section of the handle; and

a plurality of mixing blades which extend in planes perpendicular to the plane of the supporting and ring-shaped mixing blades.

4,175,876
DRIVE MECHANISM FOR PRINTER

Seiji Hanaoka, Shiojiri, Japan, assignor to Shinshu Seiki Kabushiki Kaisha and Kabushiki Kaisha Suwa Seikosha, both of Tokyo, Japan

Filed Nov. 15, 1977, Ser. No. 852,001
Claims priority, application Japan, Nov. 15, 1976, 51-137151
Int. Cl.[2] B41J *3/12, 23/14, 33/04*
U.S. Cl. 400—124 **42 Claims**



1. A printer for printing characters on recording tape means by impacting printing means into an ink ribbon against the tape means comprising;

a frame;

disc means rotatably mounted to said frame;

lever means pivotally mounted to said frame and operatively engaged with said disc means for reciprocatively pivoting said lever means in response to rotation of said disc means;

printing means slideably mounted to said frame and engaged with said lever means for reciprocative displacement across the tape means in response to pivoting of said lever means for effecting printing in at least one direction of said displacement;

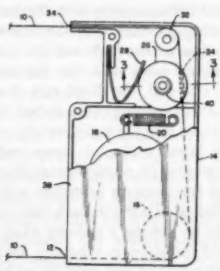
tape feeding means mounted to said frame and cooperatively engaged with said disc means for incrementally feeding said tape means at least in part in response to rotating of said disc means; and

ribbon winding means mounted to said frame and operatively coupled to said lever means for incrementally winding said ribbon means at least in part in response to pivoting of said lever means.

4,175,877
RIBBON CARTRIDGE HAVING A CONVOLUTE-FORMING ROLLER

John E. Randolph, Palatine, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Mar. 6, 1978, Ser. No. 883,771
Int. Cl.[2] B41J *33/10*
U.S. Cl. 400—196 **7 Claims**



1. An improved ribbon cartridge of the type in which an endless ribbon is stored within a cartridge housing prior to use of the ribbon, the cartridge being mountable in an apparatus so that in the mounting operation the ribbon is withdrawn from a convoluted storage within the cartridge housing and is guided in operation through the cartridge housing, wherein the improvement comprises:

a convolute-forming roller rotatably mounted in the cartridge;

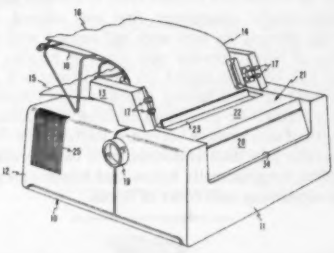
a chord-oriented guide path in the roller through which the ribbon passes in operation; and

means for limiting extraneous rotation of the roller.

4,175,878
PRINTER COVER ASSEMBLY

James W. Wing, Zumbro Falls, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 12, 1977, Ser. No. 786,922
Int. Cl.[2] B41J *29/02*
U.S. Cl. 400—693 **3 Claims**



1. A printer having a print mechanism, a roller platen and a continuous form paper tractor for moving a continuous paper web over said platen comprising

a base member which is connected to and supports said print mechanism;

a cover assembly that shrouds at least a portion of said print mechanism;

said cover assembly having front and rear sections supported on said base member and abutting one another along an interface surface;

slotted opening means formed in said cover assembly extending from said interface surface;

support means carried by said paper tractor which extend through said slotted opening means and are connected to said print mechanism whereby said paper tractor is supported exterior of said cover assembly sections;

releaseable retaining means for securing said cover assembly front section and said cover assembly rear section to said base member;

said front section being removeable from said base member in a forward direction, upon release of said releaseable retaining means, without removal or disassembly of said paper tractor and

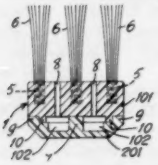
said rear section being removeable from said base member in a rearward direction, upon release of said releaseable retaining means, without removal or disassembly of said paper tractor;

whereby said cover assembly can be removed from said base member to expose said print mechanism without removal or disassembly of said paper tractor.

4,175,879
TOOTHBRUSH

Pietro Molinari, 8, Piazza Foraggi, Trieste, Italy (34100)

Filed May 27, 1977, Ser. No. 801,268
Claims priority, application Italy, May 31, 1976, 59809/76[U]
Int. Cl.[2] A46B *11/02*
U.S. Cl. 401—287 2 Claims

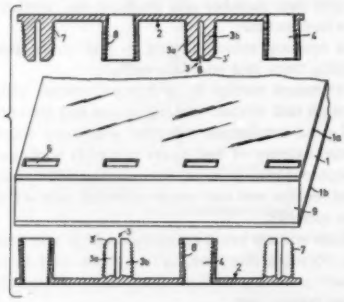


1. A toothbrush comprising
(a) a handle having a portion carrying a plurality of rows of bristles at one end thereof, and a duct extending longitudinally through said handle;
(b) at least two rows of water-dispensing bores in between said rows of bristles;
(c) a water inlet connecting member being provided at the other end of said handle and communicating with said bore via said duct, said connecting member being connectable, by means of a flexible tube, to a water supply source;
(d) said handle comprising first and second longitudinal plastic halves, the first said half having said at least two rows of bores between said rows of bristles, the second said half being designed for complementary fit with the first said half and having a longitudinal substantially centrally located rib extending continuously substantially the length of said rows of bores and abutting the first said half, whereby said duct is divided into two parallel ducts extending longitudinally below said bristle-carrying portion and separating said rows of bores.

4,175,880
DEVICE FOR INTERLOCKING PERFORATED WRITING MATERIAL

Wilhelm Müller, Frankfurt, Fed. Rep. of Germany, assignor to Postalia GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Sep. 16, 1977, Ser. No. 831,107
Claims priority, application Fed. Rep. of Germany, Sep. 6, 1978, 2640090
Int. Cl.[2] B42F *3/02*
U.S. Cl. 402—48 13 Claims

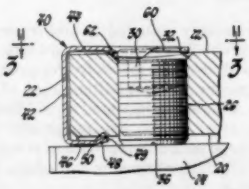


1. Device for interlocking a stack of writing material having perforations formed therein along a margin thereof, the perforations formed in the writing material being aligned in the stack thereof so as to form respective through-bores extending from opposite marginal surfaces of the stack that are disposed adjacent to and on both sides of a back surface of the stack, comprising two binding strips of monolithic identical construction, each of said binding strips having a first portion engageable with the back of the writing-material stack for covering at least part thereof, and a second portion engageable with and covering a respective one of the opposite marginal surfaces of the stack, each of said binding strips further having stringing rods and sleeves extending from the respective second portion thereof, said rods and sleeves being disposed in mutually alternating sequence and having a mutual equal spacing corresponding to the spacing of the aligned holes formed in the stack of writing material, said rods being formed with outer detents along the length thereof and said sleeves being formed with corresponding inner detents along the length thereof, the rods of each of the two binding strips being lockingly engageable in the sleeves of the other of the two binding strips by said detents thereof within the respective through-bores formed in the stack of writing material.

4,175,881
SELF-ALIGNMENT CLIP FOR ALIGNING HUBS TO FLAT SHAFTS

John H. Loos, Dayton, Ohio, assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Dec. 4, 1978, Ser. No. 966,358
Int. Cl.[2] F16D *1/06*
U.S. Cl. 403—13 1 Claim



1. An alignment clip for aligning a hub for a rotary structure with a shaft which has a flat portion extending from one end thereof and engageable with a set screw or the like, said hub having a generally cylindrical bore therein which extends therethrough from one end to another, said bore being circular in cross section so as to normally receive said shaft in any angular relation, said hub also having a radial bore which is oriented with its principal axis generally perpendicular with respect to the longitudinal axis of said cylindrical bore and intersecting said cylindrical bore, said radial bore outer end periphery having an edge portion beveled at a defined angle, said clip comprising a U-shaped resilient sheet metal member in cross-section including a base portion and two relatively flat outer and inner parallel arms extending normally from the opposite ends of said base portion, said inner arm having a free end terminating in a tab inclined toward said outer arm, said clip being adapted for assembly with the hub one end with its outer arm extending parallel with the axis of said cylindrical bore on the exterior of the hub and its inner arm extending within the cylindrical bore with the clip base portion closely adjacent the hub one end, the distal end of said clip outer arm including an axially extending open-ended slot formed with an inner radiused closed end for substantially concentric location with said radial bore, said slot inner radiused closed end formed with an integral lip portion extending toward said inner arm and adapted for snap-on retention engagement with the radial bore beveled edge portion such that said inclined tab free end is adapted to be spaced a defined axial distance from the inner edge of said radial bore, whereby said clip is positioned with respect to the axes of said cylindrical bore and said radial bore to form a plane with said inner leg as a chord of said hub cylindrical bore substantially normal to the axis of said radial bore to provide shaft alignment means in cooperation with the flat on the shaft, whereby during telescopic insertion of the shaft into the other end of the hub bore the shaft end contacts

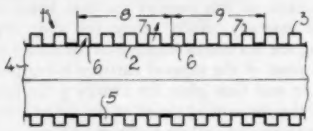
said inner arm inclined tab permitting the flat of the shaft to be positioned in juxtaposed substantially parallel relation with the plane of said inner arm only when the hub and shaft are in the desired angular relationship with respect to said radial bore, whereby the set screw or the like received in the radial bore must engage the flat of the shaft to hold the hub in fixed assembled relation with the shaft.

4,175,882

HOSE CONDUITS FOR DRIP- OR TRICKLE EMISSION

Gideon Gilead, 5 Nicaraqua St., Jerusalem, Israel

Filed Dec. 29, 1976, Ser. No. 755,482
Claims priority, application Israel, Jan. 8, 1976, 48810
Int. Cl.[2] E02B *13/00*; B05B *15/00*
U.S. Cl. 405—43 **8 Claims**



8. A laminated structure for use in irrigation, said laminated structure comprising:

a first longitudinal layer of flexible flat foil; and

a second longitudinal layer of flexible flat foil substantially coextensive with said first layer and provided with at least one longitudinally extending area of embossed, raised groove patterns, each of said groove patterns being formed as an elongated circuitous path including a plurality of adjacent raised communicating portions, said elongated path having walls defined by said second longitudinal layer, said walls of said adjacent communicating portions being separated from each other by intermediate areas of said second layer at which said first and second longitudinal layers lie in touching relationship and are fused together;

said groove patterns being spaced from opposite longitudinal edges of said first and second layers by flat margins free of said embossed groove patterns; and

a plurality of bosses formed on said second longitudinal layer extending from the surface of said second foil in the direction of and outwardly from said embossed grooved patterns, said bosses being longitudinally spaced by predetermined distances from one another, the interior of each said boss being in communication with the interior of one of said groove patterns;

said first and second layers being fused together in face-to-face confronting relationship at said flat margins, the concavity of said groove patterns being directed toward said first layer, there being at least one hole through said second layer in each said groove pattern and at least one hole through said first layer communicating with a groove in each said groove pattern, the outermost portions of said bosses being adapted to be cut away to form outlets from each said groove pattern;

said substantially flat laminated structure of said first and second layers being folded along its median longitudinal line so that said flat margins are in face-to-face contact and are secured together, to define a double wall hose having a single seam and wherein said groove patterns form a portion of the wall of said irrigation hose;

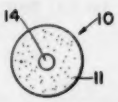
whereby the substantially flat folded laminated structure is easily rolled and transported and is adapted to conduct fluid through the interior of said thus formed irrigation hose, fluid flowing through the interior thereof communicating with said groove patterns from the interior of said hose through said holes in said first layer and being emitted from said irrigation hose through said bosses.

4,175,883

COMPOSITE STRUCTURAL MEMBERS AND FASTENING METHODS

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Sep. 2, 1977, Ser. No. 830,063
Int. Cl.[2] B25G *3/00*; F16B *7/00*
U.S. Cl. 403—347 **11 Claims**



1. An elongated composite structural member for use in constructing assemblies above the ground comprising in combination:

an elongated metal structural core member,

one end of said structural core member being shaped to permit and facilitate its penetration of the ground,

a sheathing formed of structural cellular plastic resin,

said structural cellular plastic sheathing covering a portion of said core member with the portion of said elongated structural core member which is shaped to facilitate insertion of the composite structural member into the ground being void of said structural cellular plastic resin defining said sheathing,

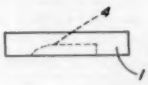
the upper end of said metal core member being exposed to the exterior of said sheathing to permit force to be applied directly to the end of said core member without damaging the upper end of the structural cellular plastic sheathing to permit forcing said composite structural member into the ground a degree such that the elongated structural member may be supported by and above the ground.

4,175,884

ASSEMBLY STRUCTURE OF TENON AND MORTISE

Shui-Shan Cheng, No. 29 Ta She Rd., Lu Chu Kaohsiung, Taiwan

Filed Jun. 6, 1978, Ser. No. 912,968
Int. Cl.[2] F16B *12/10*
U.S. Cl. 403—353 **3 Claims**



1. For use in forming a tenon and mortise-type joint structure, an element having a projection defining a tenon of dovetail form comprising side walls tapering outwardly from a surface of said element towards an outer surface of the tenon, said tenon further tapering lengthwise from a cross section of maximum dimension located at a central section of the tenon to a cross section of lesser dimension at one end of the tenon and said outer surface of the tenon including a first portion extending from said central portion of the tenon to said one end of the tenon and a second portion extending from said central section of the tenon to said other end of the tenon, said first portion being substantially parallel to said surface of the element and said second portion being inclined downardly from said central section of the tenon towards the other end of the tenon, said second portion of the outer surface facilitating insertion of the tenon into a closed-end mortise-type groove of complementary shape to the tenon but of limited length.

4,175,885

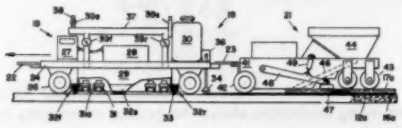
METHODS FOR SEALING AND RESEALING CONCRETE USING MICROWAVE ENERGY

Morris R. Jeppson, Carmel, Calif., assignor to Giselle V. Laurmann, Carmel, Calif.; Richard R. Blurton and Claire M. Blurton, both of Incline Village, Nev., part interest to each

Continuation-in-part of Ser. No. 756,365, Jan. 3, 1977. This application Dec. 14, 1977, Ser. No. 860,158

Int. Cl.[2] E01C *7/06*

U.S. Cl. 404—77 **19 Claims**



1. A method for sealing cement concrete pavement comprising the steps:

directing microwave energy into said cement concrete pavement to generate heat within sub-surface regions of said concrete pavement,

applying a layer of thermoplastic sealant to the surface of said heated cement concrete pavement, said sealant being temporarily in a hot, at least semi-liquid condition while in contact with said heated cement concrete pavement,

applying an overlayer of asphaltic concrete on said sealant layer, and

compacting said overlayer of asphaltic concrete and said sealant layer against said concrete pavement while still in a heated condition to produce a sealed composite pavement which may be resealed at a later time by a repeated heating and recompaction.

4,175,886

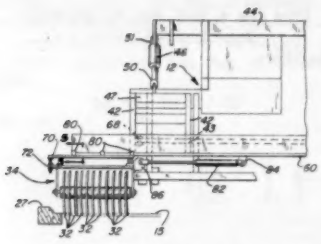
ASPHALT CUTTING APPARATUS

Frank F. Moench, and Lawrence R. Moench, both of P.O. Box 6484, Albuquerque, N. Mex. 87107

Filed May 15, 1978, Ser. No. 906,273

Int. Cl.[2] E01C *23/12*

U.S. Cl. 404—90 **6 Claims**



1. In apparatus for cutting or breaking up a paved asphalt surface comprising:

a wheeled vehicle;

a main frame pivotally attached at a front end portion to said vehicle for vertical movement relative to said pivotal attachment and having an orientation generally parallel to a longitudinal axis of said vehicle;

a hydraulic clamp cylinder coupled to said frame to adjust the elevation of the rear end portion of said frame and to hold said frame at a selected elevation;

a generally horizontal slide support adjustably movably attached to said frame to position said slide support at different angles to the longitudinal axis of said main frame;

a cutter disc support carriage comprising a slide plate slidably mounted to the slide support, a pivot plate pivotally attached to said slide plate and a pair of spaced parallel cutter disc support plates attached to the pivot plate at substantially right angles to said pivot plate;

a stationary support shaft mounted to said support plates of said support carriage; and

a plurality of circular cutter discs freely rotatably mounted in series to said support shaft with each cutter disc having a sharpened outer circumferential edge,

whereby as the vehicle is moved in a direction parallel to its longitudinal axis along the asphalt surface the cutter discs are pulled across the surface and are forced into the asphaltic material by said clamp cylinder and roll through and cut or break up the asphaltic material,

said slide support being adjustably movable at an angle to the longitudinal axis of said vehicle so that the cutter discs are oriented at an angle to the direction of motion of said main frame for windrowing the broken-up material,

said slide plate of the support carriage being adjustably movable laterally axially along the slide support for changing the horizontal location of the cutter discs,

said pivot plate of the support carriage being pivotal with respect to said slide plate for changing the lateral slope and thereby the cutting depth of the cutter discs relative to one another for cutting a sloped surface.

4,175,887

ANTI-SWELL PROTECTIVE DEVICE

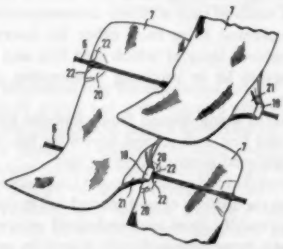
Georges L. Mougin, Paris, France, assignor to ITI Limited, Paris, France

Filed Feb. 15, 1978, Ser. No. 877,845

Claims priority, application France, Oct. 3, 1977, 77 29629

Int. Cl.[2] E02B *3/00*

U.S. Cl. 405—25 **10 Claims**



1. A device for protecting an off-shore structure from the effects of ocean swell, the device being stretched, in use, between two floating towers, wherein the device comprises two vertical arrays of horizontal cables stretched between the two floating towers, a first one of the arrays supporting an assembly of deflection panels and the other array serving to brace the first array against movement in a direction generally perpendicular to its plane.

4,175,888

BLOCK FOR CONSTRUCTING BREAKWATER

Takeshi Ijima, Fukuoka, Japan, assignor to Iida Kensetsu Co., Ltd., Fukuoka, Japan

Filed Jun. 12, 1978, Ser. No. 914,719

Int. Cl.[2] E02B *3/06*

U.S. Cl. 405—31 **9 Claims**

1. A block for constructing a breakwater comprising:

a front wall,

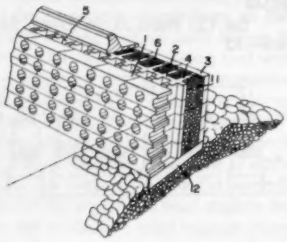
an intermediate wall disposed in parallel and spaced-apart relationship relative to said front wall,

a rear wall disposed in parallel and spaced-apart relationship relative to said intermediate wall,

a pair of parallel and spaced-apart partition walls, said partition walls being disposed perpendicularly to said front,

intermediate, and rear walls and integrally connecting said three walls to form a first vertical open-ended chamber between said front and intermediate walls and a second vertical open-ended chamber between said intermediate and rear walls,

said front wall having a horizontal hole disposed in the central portion thereof for introducing water into said first chamber, said front wall also having cut-out portions



disposed at both sides thereof, each of said cut-out portions having a cross-sectional area substantially equal to one-half of the cross-sectional area of said horizontal hole, said horizontal hole and said cut-out portions constituting 25 to 35 percent of the total area of said front wall, whereby water passing through said horizontal hole and cut-outs serve to alleviate the impulse pressure received by the breakwater.

4,175,889

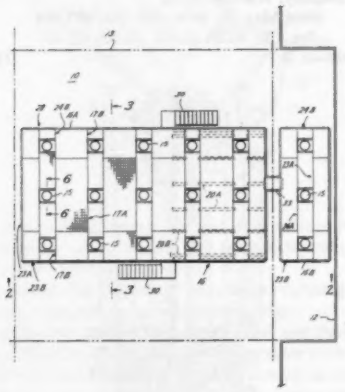
SUBFLOOR FOR OFFSHORE PRODUCTION PLATFORM

Charles W. Phaup, Dallas, and Joseph D. Lower, Houston, both of Tex., assignors to JBC Enterprises, Inc., Houston, Tex.

Filed Jun. 12, 1978, Ser. No. 914,963

Int. Cl.[2] E02D *21/00*; E04G *1/36*

U.S. Cl. 405—195 **5 Claims**



1. A modular type subfloor in the well bay area to facilitate access to laterally and longitudinally extending rows of Christmas trees rising above the cellar deck beneath the main deck of the well bay area of an offshore production platform, said subfloor comprising a first set of modules each comprising a floor supported on legs and adapted to be moved laterally into end-to-end position between adjacent lateral rows of trees to dispose their floors in horizontal alignment adjacent an intermediate level of the trees, a second set of modules each also comprising a floor supported on legs and adapted to be moved laterally into position on the outer side of each of the adjacent lateral rows of trees to dispose their floors in horizontal alignment with one another and with the floors of the first set of modules, and panels movable into positions spanning the spaces between and supported on the modules of the first and second sets intermediate adjacent trees in each lateral row of trees, each panel comprising a floor which is horizontally aligned with the floors of the other panels and the floors of the modules when so supported.

4,175,890

JOINTS FOR ANCHORING STRUCTURES TO THE SEA BED

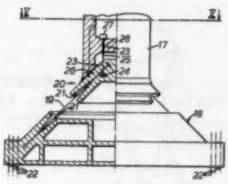
Reginald S. Taylor, Gerrards Cross, England, assignor to Taylor Woodrow Construction Limited, Middlesex, England

Filed Feb. 6, 1976, Ser. No. 655,981

Claims priority, application United Kingdom, Feb. 6, 1975, 5189/75; Jul. 16, 1975, 29895/75

Int. Cl.[2] E02D *27/04*

U.S. Cl. 405—202 **18 Claims**



1. A joint for anchoring a structure to the sea bed such that the structure can articulate; the joint comprising a first member that is to be located with respect to the sea bed, and a second member for attaching to the first member a structure to be anchored; the first and second members being connected by flexible tendons with a clearance between the members such that pivotal motion between the two members is permitted without the members coming into bearing contact, wherein said tendons are attached to one of the members at two or more levels.

4,175,891

AUXILIARY WALKING MINE SUPPORT

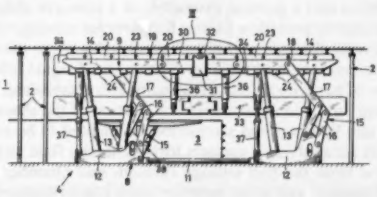
Gerhard von Klinggräff, Neukirchen-Vluyn; Peter Marr, and Karlheinz Bohnes, both of Bochum, all of Fed. Rep. of Germany, assignors to Bochumer Eisenhütte Heintzmann GmbH & Co., Bochum, Fed. Rep. of Germany

Filed Oct. 10, 1978, Ser. No. 950,536

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1977, 2745358

Int. Cl.[2] E21D *15/44*

U.S. Cl. 405—291 **15 Claims**



1. A walking mine support, particularly for supporting the area where a face gallery opens into a roadway provided with longitudinally spaced stationary supports, comprising a pair of adjacent supporting frames each having a multipartite sole plate and a multipartite roof shield; four-bar linkages connecting the sole plate with the roof shield of each frame; rams

supporting the roof shield of each frame on the sole plate thereof with freedom of vertical adjustment; a multi-section overshield above each of said roof shields; a plurality of supports connecting each multi-section shield to the respective roof shield; and means for effecting step-wise advancement of said frames relative to one another in direction lengthwise of the roadway.

4,175,892

PARTICLE MONITOR

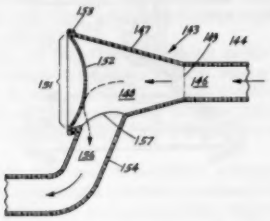
Robert J. De brey, 1830 E. 42nd St., Minneapolis, Minn. 55407

Continuation of Ser. No. 487,676, Jul. 11, 1974, abandoned, which is a continuation of Ser. No. 252,323, May 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 37,157, May 14, 1970, Pat. No. 3,674,316. This application Sep. 5, 1978, Ser. No. 939,384

The portion of the term of this patent subsequent to Jul. 4, 1989, has been disclaimed.

Int. Cl.[2] **B65G** *53/66*

U.S. Cl. 406—35 **19 Claims**



9. An apparatus for sensing particles in a flowing fluid comprising: first means having a first passage for carrying fluid, second means having a second passage for carrying fluid, connecting means joining the first means with the second means, said first means extended toward the connecting means and said second means extended away from the connecting means, said connecting means comprising a housing having an inside wall surrounding a large chamber open to the first passage and an outlet opening open to the second passage, said housing having an inlet opening in communication with the first passage and an open end generally aligned with the inlet opening, said open end being substantially larger than the inlet opening, said chamber generally increasing in cross section as a function of distance away from the inlet opening toward the open end, particle sensing means mounted on said housing and located across the open end of said housing opposite the inlet opening adjacent the outlet opening and inclined with respect to the longitudinal axis of the first passage, said sensing means comprising a flexible sheet member located across the open end of the housing, said sheet member having an outer peripheral portion and a portion extendible in a concave shape into the chamber to provide a barrier for particles moving with the fluid flowing through said chamber whereby when said particles strike said sheet member a readable sound signal related to the flow of particles through the chamber is established, means mounting only said outer peripheral portion of the sheet member on said housing, said second means adapted to be coupled to means for applying a vacuum force whereby fluid and particles flow from the first passage through said chamber to the second passage, said sheet member being placed under tension by vacuum force applied to the chamber, said sheet member having a thickness and flexibility so that portions of the sheet member that are hit by particles moving with the fluid flowing through the chamber are repetitively moved outwardly by the moving particles and moved inwardly by the vacuum force, whereby said portions of the sheet member have repetitive wave-like movements which inhibit collection of particles on the sheet member.

4,175,893

METHOD AND APPARATUS FOR FEEDING A CARDING GROUP WITH PNEUMATIC CONVEYING SYSTEM

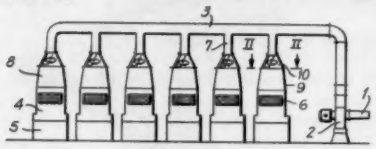
Ulrich Vollrath, Neuss, and Ferdinand Leifeld, Kempen, both of Fed. Rep. of Germany, assignors to Trutzschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed May 4, 1978, Ser. No. 903,028

Claims priority, application Fed. Rep. of Germany, May 8, 1977, 2720340

Int. Cl.[2] **B65G** *53/36, 53/48, 53/60*

U.S. Cl. 406—52 **12 Claims**



1. A method for separating fiber flakes from a transporting air stream, particularly for feeding a carding group, comprising the steps of: feeding a plurality of feed chutes; breaking up said fiber flakes for converting compacted fiber flow into substantially loose flakes; distributing the flake flow with uniform circular motion; distributing said fiber flakes in a horizontal plane; pressing said fiber flakes against a cylindrical or cone-shaped inner jacket surface; forming a flake layer with circular cross section; transforming said flake layer into a form of rectangular cross section for producing a flake fill with substantially uniform height distribution and substantially free of regions of heavier and lighter density; depositing said fiber flakes as flake layer of rectangular cross section for providing a uniform carding layer.

4,175,894

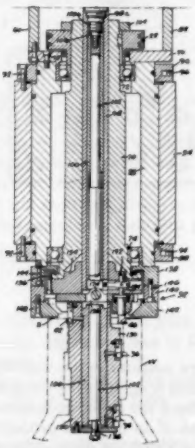
BORING MACHINE

Frank C. Skrentner, Bloomfield Hills, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.

Filed May 19, 1978, Ser. No. 907,684

Int. Cl.[2] **B23B** *35/00, 39/02, 41/00*

U.S. Cl. 408—1 R **22 Claims**



22. The method of simultaneously machining two counterbores around two laterally spaced openings in a workpiece, each to a precise depth measured from locating surface on the workpiece extending around each of the openings which comprises: mounting two boring bars on a movable support for independent sliding movement along parallel axes spaced apart

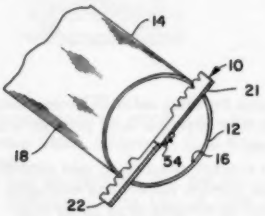
laterally a distance corresponding to the distance between the axes of the two counterbores to be machined; mounting on each boring bar first and second cutting tools which are located in generally the same plane on each boring bar spaced axially from a stop on each boring bar adapted to engage the respective locating surfaces around each opening, the first cutting tool on each boring bar having its cutting edge spaced radially from the axis of its respective boring bar to machine the side wall of the respective counterbore to the desired diameter, the second cutting tool on each boring bar being located radially inwardly of the first cutting tool with its cutting edge spaced axially from the stop on the respective boring bar a distance corresponding to the depth of the respective bore to be machined; rotating said boring bars and simultaneously moving said support in a rectilinear path parallel to the axes of the boring bars toward the workpiece to introduce the two boring bars into the two openings in the workpiece; continuing movement of the support at least slightly beyond its position when the last of the two stops engages its respective locating surface on the workpiece such that each of the first-mentioned cutting tools machines the side wall of its respective counterbore to at least the approximate depth of the counterbore; and, thereafter, feeding each of the second tools radially outwardly to machine the face of each counterbore to the precise depth relative to its respective locating surface.

4,175,895

TUBING REAMER

H. Willard Burroughs, 225 Country Club Dr., D 142, Largo, Fla. 33541

Filed Apr. 24, 1978, Ser. No. 899,327
Int. Cl.[2] B23D *79/08*
U.S. Cl. 408—228 **13 Claims**



1. A device for finishing the end of a tubing, the tubing having an inside tubing surface and an outside tubing surface, comprising in combination:

a first member having first groove means defining an inside cutting edge and an outside cutting edge;

said inside and outside cutting edges of said first member being fixed in position in said first member with at least a portion of said inside cutting edge forming an acute angle with at least a portion of said outside cutting edge;

a second member having second groove means defining an inside cutting edge and an outside cutting edge;

said inside and outside cutting edges of said second member being fixed in position in said second member with at least a portion of said inside cutting edge forming an acute angle with at least a portion of said outside cutting edge; and

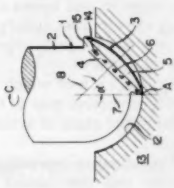
connecting means for adjustably connecting said first member to said second member enabling said inside and outside cutting edges of said first and second members to respectively finish the inside and the outside tubing surfaces of the tubing end upon rotation of said first and second members relative to the tubing.

4,175,896

BALL ENDMILL

Tateshi Kishinami, Sapporo, and Makoto Sato, Kanagawa, both of Japan, assignors to Toshiba Tungaloy Co., Ltd., Sapporo and Makino Milling Machine Co., Ltd., Kanagawa, both of, Japan

Filed Jul. 19, 1978, Ser. No. 926,023
Claims priority, application Japan, Jul. 25, 1977, 52-88935; Jul. 25, 1977, 52-88936; Aug. 8, 1977, 52-94852; Aug. 13, 1977, 52-97297
Int. Cl.[2] B23B *51/00, 51/14;* B26D *1/12*
U.S. Cl. 408—230 **6 Claims**



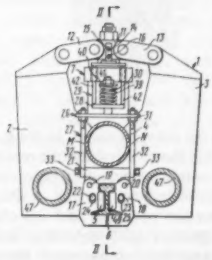
1. A ball endmill comprising a cylindrical body and a cutting element provided with one end of the cylindrical body and having a face and at least one arcuate cutting edge, said face being convexed and forming a part of the surface of an imaginary cone whose axis is inclined to the axis of the cylindrical body, and said arcuate cutting edge having a starting point located near the axis of the cylindrical body so as to cut a part or all of a spherical concave in a workpiece as the cylindrical body is rotated.

4,175,897

APPARATUS FOR REMOVING FLASH FROM RESISTANCE BUTT-WELD JOINTS IN RAILS

Sergei I. Kuchuk-Yatsenko, ulitsa Filatova, 1/22, kv. 47; Ivan K. Golomovzjuk, ulitsa Vetryanaya, 28, kv. 1; Valery G. Krivenko, ulitsa Ordzhonikidze, 3, kv. 35; Alexandr I. Kulesh, ulitsa 40 let Oktyabrya, 114/2, kv. 51; Vasily A. Sakharnov, ulitsa Solomenskaya, 41, kv. 93; Ivan L. Lazebny, ulitsa Metrologicheskaya, 1, and Fedor K. Porkhun, ulitsa Malokitaevskaya, 73, kv. 56, all of Kiev, U.S.S.R.

Filed Jan. 5, 1978, Ser. No. 867,318
Int. Cl.[2] B23D *1/08;* B26D *3/06*
U.S. Cl. 409—300 **7 Claims**



1. An apparatus for removing flash from resistance butt-weld in rails, the rails having a plane of symmetry, a top portion, a foot, and side surfaces interconnecting the top portion and the foot, the apparatus comprising:

a base split along the plane of symmetry of the rail and having the form of a claw clamp with two grips for engaging the rail;

clamping cylinder mounted on said base substantially on the plane of symmetry thereof and comprising a housing, a

piston movably mounted in the housing, and a rod fixedly connected with the piston;

an upper cutter whose cutting edge is shaped in conformity with the shape of the top portion of the rail head, said upper cutter being kinematically linked with said clamping cylinder;

two side cutters whose cutting edges are shaped in conformity with the shape of the side surfaces and foot of the rail; said side cutters being adapted to be hingedly connected with said upper cutter and being adapted to be coupled with the grips of said claw clamp so that, with the latter closed, the cutting edges of said side cutters jointly with the cutting edge of said upper cutter form a closed outline embracing the cross-sectional perimeter of the rail;

two first hinge joints for hingedly connecting said upper cutter with said side cutters;

two second hinge joints, each of which couples one of said side cutters with a respective grip so that said side cutters can move parallel to the plane of symmetry of said closed outline;

clearance take-up mechanism providing for the displacement of said upper and side cutters along the plane of symmetry of said closed outline into engagement with the underside of the rail foot and kinematically linking said upper cutter with the rod of said clamping cylinder; said clearance take-up mechanism comprises a pull member connected with said upper cutter.

4,175,898

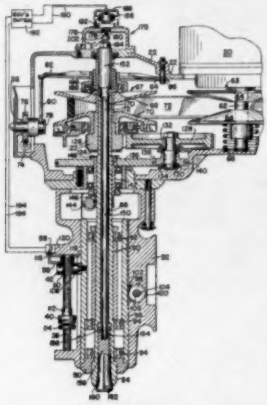
TOOL CHANGING APPARATUS

Edward H. Wood, Rte. 12, Box 494, Sanford, N.C. 27330

Filed Feb. 13, 1978, Ser. No. 876,992

Int. Cl.[2] B23C 5/26

U.S. Cl. 409—233 **5 Claims**



1. An apparatus for power assisted locking and unlocking of tools received within the tool holder of a machine, said apparatus comprising, in combination, a tool receiving collet, a drawbar including a drawbar head portion, a shank portion and a collet engaging portion opposite said drawbar head portion, means forming a part of said apparatus for supporting said drawbar against said axial movement thereof toward said collet, a drawbar drive motor for rotating said drawbar in at least one direction, and a drawbar driving member associated with said motor, cooperating means on said drawbar driving member and said drawbar head portion for providing driving engagement between said motor and said drawbar in at least one position of said drawbar, drawbar positioning means for moving said drawbar between said one position in which said drawbar head is engaged with said driving member and at least one other, second position wherein said drawbar head and said driving member are spaced apart, means for energizing said motor when said drawbar head and said drawbar drive are in said position of driving engagement, said energizing means being operatively connected to said drawbar positioning means so as to energize said motor only when said drawbar is in said one position, and means for preventing unintentional movement of said drawbar from said other position to said one position.

4,175,899

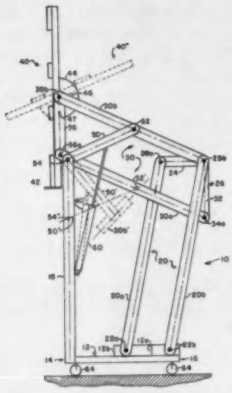
LIFTING DEVICE

Robert R. Tipton, 249 El Caminito, Livermore, Calif. 94550

Filed Dec. 30, 1977, Ser. No. 865,841

Int. Cl.[2] B66F 7/22

U.S. Cl. 414—11 **1 Claim**



1. Apparatus for lifing an object comprising

a support base having a front portion, a back portion and two ends,

a support bracket attached to said support base proximate the front portion thereof and extending upwardly therefrom and terminating in an upper end,

an angle member having two legs,

a first parallelogram member having a lower end pivotally connected to said support base and an upper end pivotally connected to said angle member,

a movable support platform,

a second parallelogram member having one end pivotally connected to said movable support platform and the other end pivotally connected to said angle member,

said second parallelogram member comprises an upper and lower leg member, one end of each leg member pivotally connected to one leg of said angle member, and the other end of each leg member pivotally connected to said support platform,

a spacer arm having one end pivotally connected to said support bracket and the other end pivotally connected to said second parallelogram member between said angle bracket and said support platform, and

said point of connection of said spacer arm to said support base is of a height above said support base approximately equal to the height above said support base of the pivotal connection to said angle member and said leg member to which said spacer arm is connected when said first parallelogram member is in the vertical position, and

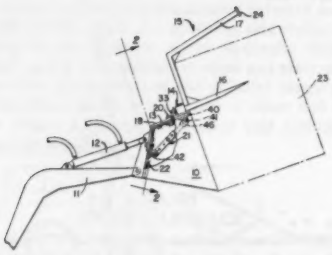
means for raising and lowering said support platform.

4,175,900

PLUG-IN BALE MOVER

John L. Etzler, Rte. 2, Box 239, Troutville, Va. 24175

Filed Aug. 16, 1977, Ser. No. 825,168
Int. Cl.[2] E02F *3/81*
U.S. Cl. 414—787 7 Claims



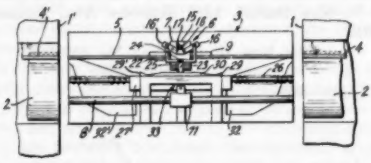
1. An assembly of tines for use with a hitch assembly comprising three tines located in a common plane, mounting means and pointed ends integral with said tines, means attached to said tines between said mounting means and said pointed ends for spacing said tines one from the other and maintaining said tines in a predetermined relationship, a safety bar, with abutment means forming a blunt end thereon, means for maintaining said safety bar in a predetermined relationship to said tines, said abutment means being spaced from said maintaining means, said safety bar being spaced above said tines, between said outermost tines, wherein said safety bar and one of said tines define a plane which is perpendicular to said common plane.

4,175,901

AUTOMATIC COMMODITY STORING APPARATUS

Yoichi Tabata, Osaka, Japan, assignor to Itoki Kosakusho Co., Ltd., Osaka, Japan

Filed Dec. 29, 1977, Ser. No. 865,691
Claims priority, application Japan, Dec. 29, 1976, 51/159640
Int. Cl.[2] B65G *1/02*
U.S. Cl. 414—282 5 Claims



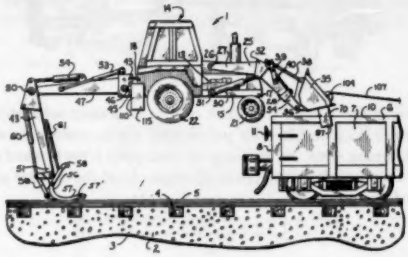
1. Automatic apparatus for the storage of commodities, comprising, a plurality of shelves arranged to provide storage positions in the vertical and horizontal direction, a commodity carriage containing a commodity to be stored, and arranged, to move up and down and left and right along a front face of said shelves, means to position said commodity carriage at a point facing a predetermined storage position in the shelves, means for insertion and retrieval of said commodity, said insertion and retrieval means being slidably displaceable, and means operationally coupled to said insertion and retrieval means for slidable displacement therewith for pushing aside adjacent ones of said commodity to facilitate retrieval and insertion of said commodity into said predetermined storage position.

4,175,902

APPARATUS FOR LOADING AND UNLOADING RAILROAD CARS

Stanley M. Herzog, and Randy L. Poggemiller, both of St. Joseph, Mo., assignors to Herzog Contracting Corporation, St. Joseph, Mo.

Filed May 5, 1978, Ser. No. 903,177
Int. Cl.[2] B65G *67/24*
U.S. Cl. 414—339 10 Claims



1. A mobile apparatus for loading and unloading an open top railroad car and the like having spaced, parallel side walls with upper surfaces, said apparatus comprising:

(a) a mobile, powered apparatus having front and rear ends and front and rear wheels movable over ground surface;

(b) a power actuated front boom structure pivotally mounted at said apparatus front end, said front boom structure being of a length to reach below ground surface when said apparatus is positioned on the ground surface for elevating said front wheels above said ground surface and including a front supportive foot member having surfaces engageable with said side wall upper surfaces for supporting said apparatus front end thereon and including lateral movement limiting arm members extending therefrom and engageable with side surfaces of said side walls;

(c) power actuated, outwardly swingable outrigger arms pivotally connected adjacent to said apparatus rear end and movable toward said side wall upper surfaces, said outrigger arms including free ends having rear supportive foot members engageable with said side wall upper surfaces for supporting said apparatus rear end thereon and respectively including lateral movement limiting arm members extending therefrom and engageable with side surfaces of said side walls; and

(d) a power actuated rear boom structure pivotally mounted at said apparatus rear end and being of a combined length to reach the ground surface when said apparatus is positioned on the upper surfaces of said side walls, said rear boom structure having respective arm lengths with a material engaging device connected thereto and operable to handle materials for loading and unloading operations relative to said railroad car when said apparatus is positioned upon the upper surfaces of the railroad car side walls.

4,175,903

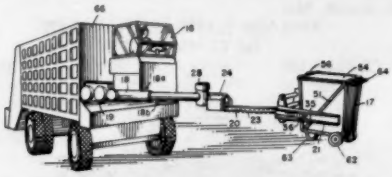
PICK-UP APPARATUS AND CONTAINING ASSEMBLY

William S. Carson, 218 Escambia Dr., Winter Haven, Fla. 33880

Filed Dec. 20, 1976, Ser. No. 752,194
Int. Cl.[2] B65F *3/14*
U.S. Cl. 414—408 12 Claims

1. A container and pick-up assembly comprising in combination a container and a pick-up apparatus, the container having a top and bottom and a plurality of tubular members between the top and bottom, the pick-up apparatus having a pick-up arm, means for raising and lowering the pick-up arm, a pair of clamping arms movably mounted on the pick-up arm for movement toward and away from each other, means for moving the clamping arms toward and away from each other, each

of the clamping arms having a plurality of spaced-apart flexible and resilient projections mounted thereon and extending toward the other clamping arm, the spaced-apart projections on each clamping arm providing grooves therebetween for



receiving the tubular members on the container whereby the container may be lifted by positioning the container between the clamping arms and moving the clamping arms toward each other to clamp the projections thereon about the tubular members of the container.

4,175,904

APPARATUS FOR MOUNTING, DEMOUNTING, AND TIPPING VEHICLES

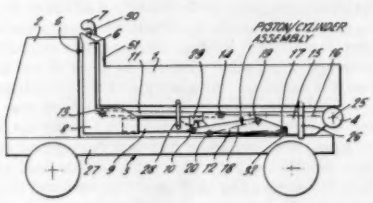
Markku Airaksinen, Iisalmi, Finland, assignor to Multilift Oy, Raisio, Finland

Continuation of Ser. No. 713,893, Aug. 12, 1976, abandoned. This application Apr. 10, 1978, Ser. No. 894,687

Claims priority, application Finland, Aug. 22, 1975, 752382; Fed. Rep. of Germany, Apr. 15, 1976, 2616813

Int. Cl.[2] B60P *1/64*

U.S. Cl. 414—421 **6 Claims**



1. Apparatus for mounting, demounting or tilting a container relative to the flat bed of a vehicle through the use of an L-shaped lever having a normally vertical arm pivotally and detachably engageable at its upper end to the front end of said container, and a normally horizontal arm positioned beneath said container and parallel to and above said flat bed, wherein the improvement comprises a pair of transverse, longitudinally spaced-apart pivots, means detachably securing said pivots to said bed, a pair of transversely spaced brackets connected at one end to the rearward of said pivots and at the other end pivotally connected to the rearward end of said horizontal arm, a thrust rod connected at one end to the forward of said pivots and at its other end pivotally connected to the junction of the vertical and horizontal arms of said lever, whereby when said pivots are attached to said bed, that portion of the bed interconnecting the spaced pivots, said thrust arm, said brackets and the horizontal arm of said lever form a rigid four bar linkage defining the path of movement of the upper end of the vertical arm of said L-shaped lever and hence the movement of the front end of said container, and a piston-cylinder assembly for moving said four bar linkage to mount and demount said container, said piston-cylinder assembly being pivotally connected at one end to said bed at a point forward of said spaced pivots, and at its other end pivotally connected to said brackets at a point intermediate their ends.

4,175,905

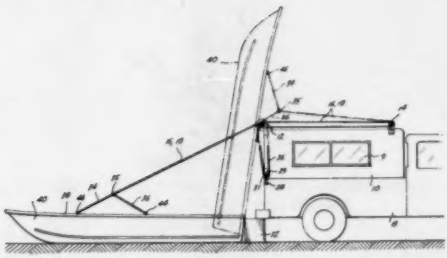
BOAT LOADER

Ray L. Garrison, deceased, late of Klamath Falls, Oreg., and R. Leonard Garrison, Jr., 300 Summit, San Rafael, Calif. 94902

Filed Feb. 16, 1979, Ser. No. 12,823

Int. Cl.[2] B60R *9/00*

U.S. Cl. 414—462 **9 Claims**



1. A boat loading and unloading mechanism for elevating a boat to the top carrying position on a vehicle comprising:

(a) a load supporting frame means for carrying a load above a vehicle, said frame means including transversely positioned support elements, at least one of said support elements being a rotatively mounted roller means;

(b) first and second running lines wrapped about said roller means exiting forwardly from the bottom thereof, said lines being trained about a forwardly positioned support element and extending rearwardly therefrom across the top of said roller means, each of said running lines having a straddle rigging means at the end thereof for straddle attachment to forwardly and rearwardly located lifting locations positioned adjacent a respective gunwale of a boat, said rearwardly positioned lifting location on each gunwale being positioned forwardly of the transom of said boat a distance less than the height of said roller means from the ground surface upon which the vehicle is positioned, said forwardly positioned lifting location being positioned forwardly of the transom a distance exceeding the height of said roller above said ground surface; whereby rotation of said boat into a position with the transom thereof on the ground causes said straddle rigging means to engage said roller.

4,175,906

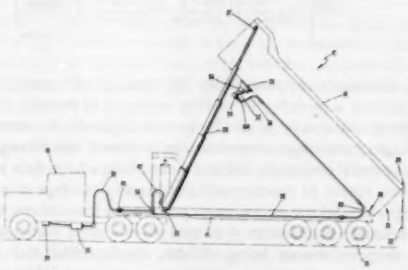
VIBRATOR FOR DUMPING VEHICLE

William T. Johnston, 3214 Laubert Rd., Atwater, Ohio 44201, and N. Glen Barker, 1010 Jefferson Ave., Alliance, Ohio 44601

Filed Nov. 10, 1977, Ser. No. 850,343

Int. Cl.[2] B60P *1/58*

U.S. Cl. 414—469 **9 Claims**



1. Apparatus for dumping a mass of particulate material from a dumping body or a vehicle comprising:

a source of hydraulic fluid under pressure;

expansible hydraulic cylinder means on said vehicle in fluid communication with said source for lifting the forward end of said body relative to the chassis of the vehicle;

vibrator means on said body including hydraulic motor means for driving a vibrator to vibrate said dumping body; and

a valve means, in fluid communication between said source and said motor means, for actuating said motor means in response to the pressure of the hydraulic fluid in said cylinder means and adapted to open and start said motor means when the pressure in said cylinder means exceeds a predetermined pressure level and to close and stop said motor means when the pressure in said cylinder means drops below said level.

4,175,907

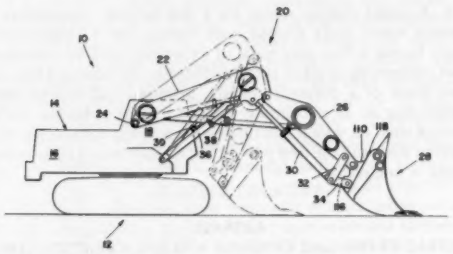
SHOVEL LINKAGE

Harvey A. Knell, Yorkville, Ill., and Stephen H. Gill, Mentor, Ohio, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 7, 1977, Ser. No. 813,728

Int. Cl.[2] E02F *3/38*

U.S. Cl. 414—715 **9 Claims**



3. A shovel linkage for a hydraulic excavator or the like comprising a boom pivotedly mounted on said excavator and actuable by first hydraulic cylinder means pivotedly connected to said excavator and said boom, and a stick pivotedly connected to said boom at the distal end thereof and actuable with respect to said boom by second hydraulic cylinder means pivotedly connected to said stick and said boom, said stick having its distal end adapted for attachment of bucket means thereto, and wherein said boom and said stick comprise spaced parallel rails, said rails having side walls joined by top and bottom walls in a generally box-like configuration, and cross tubes connecting said boom rails and said stick rails, said cross tubes comprising cylindrical members extending through the sidewalls of said rails, and between said rails and having flanges secured thereto immediately adjacent to the side walls of the rails; and

wherein the side walls of the boom rails include portions near the distal end thereof which depend below the bottom walls and have axially aligned pivot means provided therein, and wherein ends of said first hydraulic cylinder means are pivotally connected therebetween, whereby forces exerted by said cylinders will by transmitted along the centerlines of the boom and stick rails.

4,175,908

METHOD OF LOADING AND UNLOADING HEAVY OBJECTS FROM A VESSEL

Bengt V. Andersson, Västerås, Sweden, assignor to AB Resmastservice, Skövde, Sweden

Filed Jun. 9, 1977, Ser. No. 805,211

Claims priority, application Sweden, Jun. 11, 1976, 7606685

Int. Cl.[2] B65G *63/04*

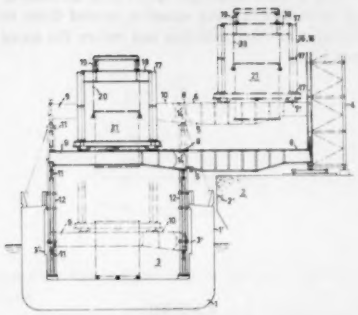
U.S. Cl. 414—786 **7 Claims**

1. A method of transferring a heavy object between a first station and a second station, said first station having a vertically stationary position while the vertical position of said second station is variable in response to the load thereon, said first and second stations having adjacent facing edges, said method comprising the steps of:

(a) transferring said object onto said first station on a movable support;

(b) lifting said object vertically from said support by means of a lifting means above said first station;

(c) moving said lifting means with said object horizontally in the direction of said second station along first support means extending in cantilever fashion horizontally over



said first station beyond said edge thereof and substantially up to the adjacent edge of said second station;

(d) displacing into alignment with said first support means a second support means horizontally disposed above said second station, said second support means being mounted on said second station for vertical up-and-down movement with respect thereto;

(e) moving said lifting means with said object from said first support means onto said second support means to a position above said second station; and

(f) lowering said object onto said second station.

4,175,909

VALVE MEANS FOR USE IN CONTROLLING OPERATION OF A HYDRAULIC MOTOR

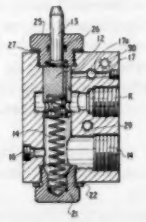
Gordon D. White, Tewkesbury, England, assignor to Bullough Limited, Epsom, England

Filed Jul. 25, 1977, Ser. No. 818,833

Claims priority, application United Kingdom, Jul. 23, 1976, 30922/76

Int. Cl.[2] F15B *13/04*

U.S. Cl. 415—145 **4 Claims**



1. A hydraulic control circuit comprising a high pressure supply line for connection to a high pressure hydraulic fluid source, a low pressure discharge line for returning hydraulic fluid to said source, a hydraulic motor having an inlet port and an outlet port and control valve means including a valve member movable between a first position in which the high pressure

supply line is connected to the inlet port of the hydraulic motor and a second position in which the high pressure supply line is connected to the discharge line, the valve member including a spool having a hollow interior which is connected permanently to the discharge line and the outlet port of the motor and having a cylindrical wall formed with ports which are closed in the first position of the valve member to prevent flow from the high pressure hydraulic fluid source into the interior of the spool and between the interior of the spool and the inlet port of the motor but which are open when the valve member is in its second position, the spool being movable within a valve block having a lubricant supply passage, the lubricant supply passage being closed when the spool is in its second position but being opened when the spool is moved from its second position towards its first position and before the spool reaches its first position.

4,175,910

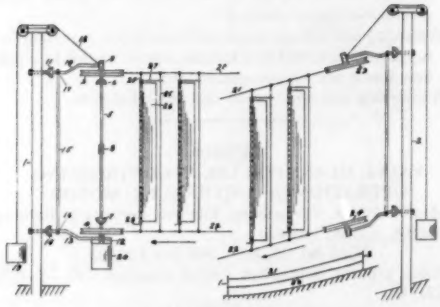
WINDMOTOR AS A WINDBREAK

Reinhold H. Nilberg, 463 Beachview Dr., N. Vancouver, Canada (V7G 1P5)

Filed Jan. 7, 1977, Ser. No. 757,763

Int. Cl.[2] F03D *5/02*

U.S. Cl. 416—8 **1 Claim**



1. A belt conveyor type windmotor, moving horizontally and consisting of two synchronized endless cables, wheels for supporting said cables, vanes attached to said cables as a belt of vanes, means for wind operated control of the pitch angle of said vanes so that said vanes are taking up the motion energy from the wind and said wheels are taking up the motion energy from said cables for transfer to a generator, wherein the improvement comprises,

means for supporting and synchronizing sagged cables of said belt of vanes consisting of following structural elements in combination,

sheaves of variable diameter to compensate for elongation of cables and to support said cables,

notches in the grooves of said sheaves for the rods attached to the cables to prevent shifting of cables in the grooves in order to ensure synchronization,

means for self-alignment of said sheaves to sagged cables so that sagged cables are running tangentially into the grooves of said sheaves, thereby reducing wear between cables and grooves.

4,175,911

RADIAL TURBINE WHEEL FOR A GAS TURBINE

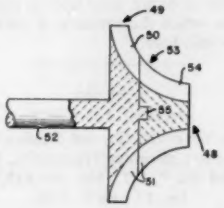
Eberhard Tiefenbacher, Ludwigsburg, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 697,193, Jun. 17, 1976, Pat. No. 4,125,344. This application May 10, 1978, Ser. No. 904,593

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1975, 2527498

Int. Cl.[2] F01D *5/28*

U.S. Cl. 416—183 **1 Claim**



1. A radial turbine wheel for a gas turbine, comprising: a turbine wheel body formed with blades, said turbine wheel body having a first part made of a ceramic material, said first part comprising an outer section of blades, and having a second part made of a different ceramic material, said second part comprising an inner centrally curved section of blades; and a turbine shaft on which said turbine wheel body is mounted, the turbine shaft and the first part of said turbine wheel body being made in one piece.

4,175,912

AXIAL FLOW GAS TURBINE ENGINE COMPRESSOR

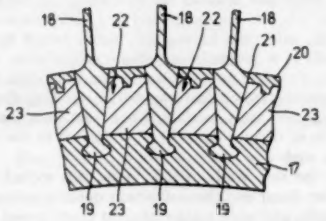
John L. Crane; Robert W. Archdale, both of Bristol, and Alan E. Webb, Berkeley, all of England, assignors to Rolls-Royce Limited, London, England

Filed Oct. 4, 1977, Ser. No. 839,292

Claims priority, application United Kingdom, Oct. 19, 1976, 43250/76

Int. Cl.[2] F01D *5/22*

U.S. Cl. 416—193 A **6 Claims**

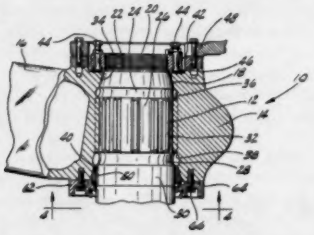


1. A rotor blade stage for the compressor of a gas turbine engine, said rotor blade stage comprising a rotor disc, a plurality of rotor blades and an infilling mixture, said rotor blades being equally spaced apart and mounted on the periphery of said rotor disc, each of said blades having opposing sides which diverge radially outwardly, the spaces between the facing sides of adjacent ones of said rotor blades in the region of the periphery of said rotor disc being infilled with said infilling mixture, said infilling mixture comprising reinforcing filaments enclosed in a matrix comprising a cured epoxy resin and a filler material, means radially outwardly of said mixture for retaining it in position between said rotor blades upon the rotation of said disc, said retaining means having sides which conform to and abut the facing sides of adjacent rotor blades and extending between the facing sides of adjacent rotor blades.

4,175,913
HELICOPTER ROTOR HEAD MOUNTING ASSEMBLY

Robert C. Rybicki, Trumbull, Conn., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 13, 1978, Ser. No. 869,185
Int. Cl.² B64C *11/02*
U.S. Cl. 416—244 R **3 Claims**



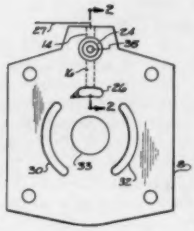
1. In a helicopter rotor head mounting assembly having an elogated rotor drive shaft, said rotor shaft being substantially cylindrical with an inward taper near the upper end thereof, and having a threaded portion beginning proximate the smallest diameter portion of said taper and extending upwardly the remaining length of said drive shaft, said rotor shaft having a vertically splined portion about the outer surface thereof below said taper, a rotor hub adapted to carry a plurality of helicopter rotor blades received by said rotor shaft, said hub having a longitudinal bore therethrough with a first tapered portion at the upper end thereof conforming to said taper on said rotor shaft, said bore being internally splined below said first tapered portion to conform to and mate with said splined portion of said rotor shaft for secure rotation therewith, said bore expanding radially outwardly and downwardly at a location below the internal splines thereof to produce a second tapered portion therewithin, means associated with said threaded portion for applying a force downwardly on said hub to firmly engage said taper of said rotor shaft with said first tapered portion of said hub; the improvement comprising: an annular split cone mounted between said rotor shaft and said hub at the location of said second tapered portion, said split cone having a cylindrical inner surface conforming to said rotor shaft and a tapered outer surface conforming to and mating with said second tapered portion of said hub bore, said split cone having an upper edge free from engagement with both said rotor shaft and said hub, an annular plate, means securing said plate to the bottom of said hub around said rotor shaft, a plurality of circumferentially spaced loading means carried by said plate, each of said loading means being adapted to apply a radially directed force to said split cone independently, thereby distributing the radially directed force to effect a uniform forced engagement between said rotor shaft and said inner surface of said split cone.

4,175,914
HYDRAULIC STOP

Dennis R. Unruh, Buhler, and Robert J. Martin, Hutchinson, both of Kans., assignors to The Cessna Aircraft Company, Hutchinson, Kans.

Filed May 31, 1977, Ser. No. 802,149
Int. Cl.² F04B *1/30*
U.S. Cl. 417—218 **3 Claims**

1. A hydraulic stop for a cam plate positioning actuator of a variable displacement axial piston pump comprising:
- a back plate having a set of pump ports including a charging port;
- a stationary portion of the actuator mounted to the back plate;
- a slidable portion of the actuator mounted on the stationary portion and fully retracted when the cam plate is in its maximum displacement position;
- a chamber in the back plate adjacent to the stationary portion of the actuator;
- a charging passage through the back plate connecting the charging port with the chamber in the back plate;
- a spring which biases the slidable portion of the actuator toward its fully retracted position;
- a chamber within the actuator for the pressurized fluid which operates the actuator;
- a pressure and flow compensator operatively connected to the actuator;

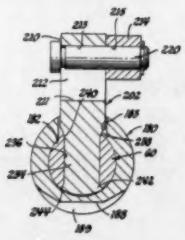


- a drain line from the compensator to the chamber in the back plate; and
- means for valving the drain port by the slidable portion of the actuator sliding over and blocking the drain port when the actuator is close to its fully retracted position which blocking causes the pressurized fluid to flow from the chamber in the back plate through the drain line from the compensator, reversing its draining direction, to the compensator and thence to the positioning actuator chamber providing the hydraulic stop so that the slidable portion of the actuator does not make metal to metal contact with the back plate.

4,175,915
DRIVE SHAFT LUG FOR VARIABLE DISPLACEMENT COMPRESSOR

Dennis A. Black, and Raymond N. Mantey, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich. and General Motors Corporation, Detroit, Mich.

Filed Apr. 27, 1978, Ser. No. 900,744
Int. Cl.² F04B *1/06*
U.S. Cl. 417—222 **1 Claim**



1. In a variable output compressor having a housing, a cylinder block disposed in said housing, a circular drive shaft having its one end journaled in one wall of said housing and its other end journaled in said cylinder block, said cylinder block having a plurality of cylinder bores formed therein substantially parallel to the axis of said drive shaft, pistons arranged to reciprocate in said cylinder bores, a wobble plate operated in response to rotation of said shaft and drivingly connected to said pistons, compressor output modulation means including a movable member for varying the angle of said wobble plate

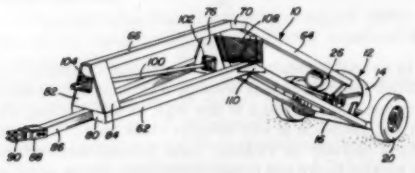
relative to said drive shaft and thus the stroke of said pistons in said cylinder bores, said modulation means including a sleeve surrounding said drive shaft in sealing relation therewith and connected to said movable member for axial movement as a unit along the axis of said shaft while maintaining said sealing relation, a longitudinally extending slot in said sleeve, said wobble plate having a pivotal connection with respect to said sleeve for pivotal movement relative to said sleeve and said drive shaft during said axial movement of said sleeve to vary the angle of said wobble plate with respect to said drive shaft, and a radial lug on said drive shaft having a rotary driving connection to said wobble plate, said driving connection including means forming a cam track at least partially offset from the axis of said lug and a follower in said cam track for interconnecting said wobble plate and said drive shaft and movable therein to a position offset from said lug axis in response to movement of said sleeve whereby said angle of said wobble plate is varied with respect to said drive shaft to infinitely vary the stroke of said pistons in said cylinder bores and thus the output of said compressor and whereby the position of said follower as it moves periodically in said cam track to said position offset from the axis of said lug tends to twistingly move and fret said lug in said shaft bore, said lug having a predetermined dimension relative to said slot such that when said lug is received in said slot a longitudinal clearance space is provided between said lug and the sides of said slot throughout the axial movement of said sleeve, the improvement wherein said radial lug comprises a solid generally cylindrical body formed with a radially outer flat sided wobble plate connection portion and radially inner shank portion having a predetermined diameter less than the diameter of said wobble plate connection portion, said drive shaft formed with a through bore the axis of which intersects said shaft axis, said shaft bore having a diameter sufficiently larger than the diameter of said shank portion to provide a clearance fit between said bore and said shank portion when said shank portion is received in said shaft bore, said lug having a radiused neck portion flaring outwardly from said shank portion in a transition from said shank portion to said wobble plate connection portion, said shaft bore formed with a flared open end complementary to at least a portion of the neck portion of said lug, and means formed on the end of said shank portion opposite from said neck portion and cooperating with said shaft for securing said lug on said shaft; said securing means when said shank portion is received in said shaft bore causing the flare on said neck portion to pull into snug coincidental engagement with the flared open end of said shaft bore while maintaining the clearance fit between said bore and said shank portion, whereby to eliminate the tendency of the follower to twistingly move said lug such that said lug has extended fatigue life throughout the operating life of said compressor by eliminating fretting at the connection of said lug with said drive shaft.

4,175,916

PUMP WITH STEEP-ANGLE HITCH AND UNIVERSAL DRIVE JOINT

Angelo J. Crisafulli, P.O. Box 1051, Glendive, Mont. 59330

Filed Nov. 18, 1977, Ser. No. 852,712
Int. Cl.² F04B *17/06, 35/06*
U.S. Cl. 417—231 **8 Claims**



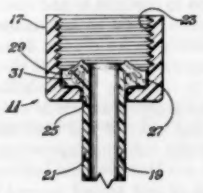
1. In a portable pump supported on an elongated rigid frame having ground engaging wheels at the rear thereof and means at the front for connecting the frame in trailing relation to a tractor or other towing vehicle, a drive shaft connected to the pump and being journaled on the frame and driven from the towing vehicle whereby the pump can be moved into a body of material to be pumped by following the contours of the retaining surface for the material to be pumped, that improvement comprising said elongated frame having a rear section attached to the pump and a front section extending toward the towing vehicle with the front and rear sections being angulated in relation to each other and joined at the center with the central portion of the frame being elevated above the end portions thereof to enable the supporting wheels to follow the retaining surface for the material to be pumped as the pump is moved thereinto, the area of the frame below the front and rear sections and the elevated central portion being free of obstructions, said drive shaft including a universal coupling at the elevated portion of the frame, said frame including vertically spaced bottom and top frame members, each frame member including a rear portion and a front portion joined together in angular relation with the included angle below the joined portions being a shallow obtuse angle, said universal coupling being disposed closer to the bottom of the frame than the top whereby the drive shaft defines a more obtuse angle than the frame members.

4,175,917

APPARATUS FOR FORMING INTEGRAL TUBING AND WASHER

Roger C. Cotten, 299 Vincent St., Metairie, La. 70002

Division of Ser. No. 881,641, Feb. 27, 1978, Pat. No. 4,140,739.
This application Aug. 21, 1978, Ser. No. 935,332
Int. Cl.² B29C *17/00, 24/00*
U.S. Cl. 425—142 **7 Claims**



1. Apparatus for automatically forming a washer integrally with walls of a thermoplastic tubing comprising:

a. a structural framework;

b. feed means for feeding a first end of the tubing on which the washer is to be formed; said feed means being disposed adjacent one end of said apparatus and aligned therewith;

c. first sensing means for automatically sensing when said tubing has been fed into place; said first sensing means being disposed so as to be responsive to said tubing being fed to said apparatus;

d. grabber means for holding said tubing; said grabber means being operatively connected with said first sensing means so as to automatically clamp said tubing upon a first signal on said first sensing means;

e. cutter means for cutting said tubing; said cutter means being operatively connected with said first sensing means so as to automatically cut said tubing upon said first signal from said first sensing means; said cutter means being disposed and adapted to cut at a predetermined location that automatically effects the correct length of tubing;

f. heater means for heating said first end of said tubing to its softening temperature; said heater means bieng disposed in alignment with said first end of said tubing for receving said tubing and being connected with a source of energy for supplying the heat for heating said first end to its softening temperature;

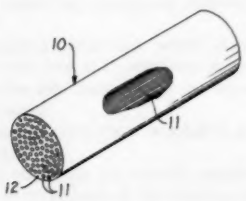
g. timer means connected with said heater means for controlling the time and duration of heating of said first end;
h. guide pin means for being inserted within said first end of said tubing a predetermined distance for maintaining the internal diameter of said first end and any washer formed thereon; said guide pin means being carried by said structural framework and at least movable into alignment with said tubing before insertion;
i. first insertion means for effecting relative longitudinal movement between said guide pin means and said tubing so as to effect insertion of said tubing over said guide pin means and said guide pin means within said tubing said predetermined distance;
j. mold carried by said structural framework so as to be movable about said first end of said tubing to hold said tubing against longitudinal movement; said mold having a washer cavity to define the exterior dimensions and form of a shaped piece to serve as said washer; said mold being disposed such that said first end of said tubing extends into said mold cavity in operation;
k. plunger disposed about said guide pin means and in alignment with said washer cavity so as to be able to compress and to fold in accordion fashion the walls of said first end longitudinally of said guide pin means and said cavity so as to form said washer;
l. second insertion means for inserting said plunger within said washer cavity with sufficient force to compress and to fold accordion fashion said walls longitudinally of said guide pin means and said washer cavity and into conformance with the mold space between said guide pin means and the walls of said washer cavity to form said shaped piece;
m. finalizing means for holding said plunger and guide pin means in their forward position for a predetermined length of time long enough to form said washer and adhere a film about and to the accordioned walls and thereafter:
i. effect opening said mold;
ii. effect retraction of said guide pin means; and
iii. effect retraction of said plunger; so as to allow said tubing with said washer to fall free; said finalizing means being carried by said structural framework; and
n. repeating and safety means for starting said feed means and repeating said cycle automatically responsive to the falling free of said tubing and washer and to prevent falling starting of another cycle and sound an alarm if said tubing and washer does not fall free.

4,175,918

ELONGATE CONSOLIDATED ARTICLE AND METHOD OF MAKING

John G. Frantzreb, Sr., Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 12, 1977, Ser. No. 859,497
Int. Cl.[2] B22F *3/00*
U.S. Cl. 428—567 **7 Claims**



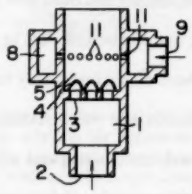
1. An elongate consolidated article for controlled insertion into a molten iron for altering same comprising:
a coherent matrix including a treating agent consisting essentially of a ferrosilicon; and
a multiplicity of elongate metallic fibers embedded within the matrix, said elongate metallic fibers extending generally along a longitudinal axis of the article and being formed from a ferrous material which will melt in the heat range of molten iron.

4,175,919

GAS BURNER

Michiaki Matsumoto, Tokyo; Juichi Honda, Fujisawa, and Sadao Mimori, Saitama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jun. 1, 1977, Ser. No. 802,462
Claims priority, application Japan, Jun. 4, 1976, 51/64516
Int. Cl.[2] F23D *15/02*
U.S. Cl. 431—114 **23 Claims**



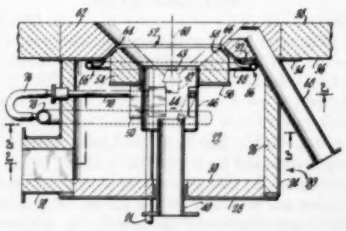
1. A preliminary mixing type gas burner comprising:
a combustion chamber and means for producing low noise and high load combustion in the combustion chamber;
a flame port means for supplying a predominantly laminar flow of a premixed gaseous fuel and primary air to said combustion chamber, said flame port means being position upstream of a primary combustion zone; and
at least one secondary air port means positioned for supplying a predominantly turbulent flow of secondary air to a location within said combustion chamber corresponding to that at which an outer flame portion downstream of a trailing stream of an inner flame is formed around said flame port means in use.

4,175,920

MULTIPLE FUEL SUPPLY SYSTEM FOR STAGED AIR BURNERS

Robert P. Guerre, Dover; Dennis L. Juedes, Morris Plains, and Ross R. Ruland, Hopatcong, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Jul. 31, 1975, Ser. No. 600,730
Int. Cl.[2] F23C *5/28*; F23M *9/00*; B05B *7/10*
U.S. Cl. 431—175 **3 Claims**



1. In a staged air burner, cylindrical swirl chamber means for creating a first swirl flow path for primary combustion air betwen an inlet and outlet thereof, tangential duct means communicating tangentially with said inlet of said swirl chamber means for creating a second tangential flow path for primary air entering said swirl chamber means to flow therein along said swirl flow path, passage means located axially down-

stream of and substantially adjacent said outlet of said swirl chamber means and surrounding and converging toward a central axis of said swirl chamber means for creating a third converging flow path for secondary combustion air to be directed inwardly toward said axis downstream of and substantially adjacent said outlet of said swirl chamber means, and at least two fuel supply means respectively situated at least in part at two of said first, second and third flow paths for selectively supplying at least one combustible fuel to said two flow paths, so that fuel from both of said fuel supply means may be simultaneously fired, wherein said swirl chamber means includes an outer cylndrical wall surrounding said axis and said tangential duct means includes a plurality of ducts respectively communicating through said cylindrical wall with the interior of said swirl chamber means and respectively projecting tangentially from said wall while being distributed about said axis, one of said two fuel supply means including a plurality of fuel injectors respectively situated in corresponding ones of said tangential ducts.

4,175,921

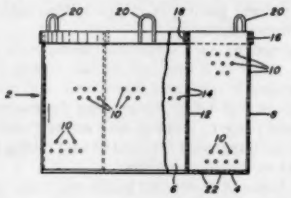
APPARATUS FOR REMOVING GASES FROM PARTICLES

Raymond L. Southern, Lower Burrell, and Orville W. Reen, New Kensington, both of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 749,958, Dec. 13, 1976, abandoned. This application Feb. 27, 1978, Ser. No. 881,203

Int. Cl.[2] C21D 9/00

U.S. Cl. 432—261 **2 Claims**



1. An apparatus for removing gases from particles in a heating furnace, the improvement comprising a cylindrical container for said particles; said container including a peripheral vertical wall, a bottom for supporting said particles, a vertical, cylindrical tubular member located centrally in said container, and an open top, wherein the peripheral wall of said container includes an outer member having a smooth inner surface and a corrugated sheet adjacent said inner surface extending completely around the periphery, and said tubular member includes an inner member having a smooth outer surface and a corrugated sheet adjacent said outer surface extending completely around the periphery, both of said corrugated sheets having closely spaced openings therein constructed of less diameter than said particles, such that the particles will not plug or pass therethrough while evolved gases will pass through the openings to the surrounding atmosphere.

4,175,922

DEHAIRING SKIN AND HIDE

Günter Eckert, Limburgerhof; France Knaflic, Frankenthal; Franz-Friedrich Miller, Ludwigshafen, and Alfred Zissel, Frankenthal, all of Fed. Rep. of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 15, 1972, Ser. No. 306,671

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1971, 2157034

Int. Cl.[2] C14C *1/06*

U.S. Cl. 8—94.16 6 Claims

1. In a drumming process for dehairing animal skin and hide using sulfur compounds in the presence of alkali or alkaline earth metal hydroxides the improvement which comprises carrying out the dehairing by drumming the animal hides or skins in the presence of air in a liquor of 10 to 50 parts by weight with reference to 100 parts by weight of raw hide, the liquor containing 1 to 2 parts by weight, with reference to 100 parts by weight of raw hide, of an α- or β-mercaptoalkanol of 2 to 6 carbon atoms and 2 to 4 parts by weight, with reference to 100 parts by weight of raw hide, of an alkali or alkaline earth metal hydroxide.

4,175,923

METHOD AND APPARATUS FOR OCCULT BLOOD TESTING IN THE HOME

William G. Friend, 9039 SE. 59th, Mercer Island, Wash. 98040

Filed Jun. 26, 1978, Ser. No. 919,395

Int. Cl.[2] G01N *21/20, 33/16*

U.S. Cl. 23—230 B 15 Claims

1. A method for determining the presence of occult blood in the bowl of a toilet containing water and fecal matter comprising the steps of:

applying a developing solution to an absorbent substrate impregnated with a guaiac reagent to form an activated test substrate,

contacting the activated test substrate with the water in said toilet bowl, and

observing whether a portion of the test substrate is dyed blue.

4,175,924

TREATMENT OF COAL WITH METAL CONTAINING COMPOUNDS

James K. Kindig, Arvada, and Ronald L. Turner, Golden, both of Colo., assignors to Hazen Research, Inc., Golden, Colo.

Filed Feb. 10, 1977, Ser. No. 767,352

Int. Cl.[2] C10L *9/10;* C10B *57/00*

U.S. Cl. 44—15 R 20 Claims

1. A process for improving coal comprising treating raw coal with a metal containing compound selected from the group consisting of:

organic iron containing compounds which exert sufficient vapor pressure, with iron as a component in the vapor, so as to bring the iron into contact with the impurity at the reaction temperature;

organic iron containing compounds in solution at the injection temperature;

solid organic iron containing compounds capable of being directly mixed in solid form at the mixing temperature with the coal; and

ferrous chloride, ferric chloride, and alkyl aluminum compounds; under conditions so as to enhance the magnetic susceptibility of various impurity components contained in the raw coal, thereby permitting their removal by magnetic separation.

4,175,925

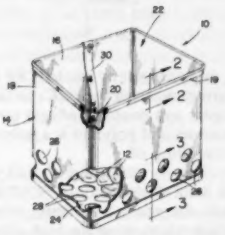
CHARCOAL-STARTER APPARATUS

Yongik Paek, and Ardis I. Paek, both of 16841 Roque La., Huntington Beach, Calif. 92647

Filed Dec. 18, 1978, Ser. No. 970,201

Int. Cl.[2] C10L *11/08, 11/00*

U.S. Cl. 44—35 7 Claims



1. A fire-starter apparatus for charcoal briquets and like combustible materials, wherein the apparatus comprises:

a disposable bag-like container formed having a first inner, vertical, upright wall structure, and a second outer, vertical, upright wall structure, wherein each wall structure is formed from a non-combustible material of thin metal foil;

a chimney flue defined by said inner and outer wall structures wherein the upper end thereof defines an opening;

a bottom wall member secured to said vertical wall structures, said bottom wall member being formed from a combustible material so as to be consumed during the ignition of said charcoals;

a plurality of air vents disposed about the lower portion of said wall structures, and additional air vents disposed in said bottom wall member, to provide air flow through said chimney flue;

means mounted to said wall structure to support said wall structure in a vertical position; and

fire-starter means secured to said upper portion of said container, and arranged to engage and ignite said charcoal or an igniting fuel.

4,175,926

POLYMER COMBINATION USEFUL IN FUEL OIL TO IMPROVE COLD FLOW PROPERTIES

Max J. Wisotsky, Highland Park, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 715,530, Aug. 18, 1976, abandoned, which is a continuation of Ser. No. 507,242, Sep. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 411,482, Oct. 31, 1973, abandoned. This application Jan. 16, 1978, Ser. No. 869,647

Int. Cl.[2] C10L *1/18*

U.S. Cl. 44—62 10 Claims

1. A fuel composition comprising a fuel consisting of wax-containing middle distillate pertroleum light fuel oil boiling in the range of 250° to 900° F., having a viscosity of 1.6 to 7.5 centistokes at 100° F., having less than 1 wt. %, based on the total weight of the fuel, of n-paraffin wax boiling above 350° C., and of which at least 5 wt. % of said oil boils above 700° F. according to ASTM-D-1160, which oil has been improved in its low temperature flow properties, said oil containing in the range of about 0.005 to 0.1 wt. %, based on the weight of the total composition, of a synergistic flow improving combination of one part by weight of an oil soluble ethylene backbone middle distillate pour point depressing polymer having a number average molecular weight in the range of about 1000 to 6000 per (b) 0.2 to 4 parts by weight of a second oil soluble polymer having a number average molecular weight in the range of about 1000 to 100,000;

wherein said ethylene backbone polymer is selected from the group consisting of branched polyethylene, and copoly-

mers consisting essentially of 4 to 20 molar proportions of ethylene with a molar proportion of ethylenically unsaturated alkyl ester of the formula:

wherein R_1 is hydrogen or methyl; R_2 is a $-OOCR_4$ or $-COOR_4$ group wherein R_4 is a C_1 to C_4 alkyl group, and R_3 is hydrogen, and mixtures of said comonomers,

and wherein said second polymer is a polymer selected from the group consisting of:

(a) ester copolymers consisting of dialkyl fumarate copolymerized with 5 to 70 mole % of a comonomer selected from the group consisting of vinyl acetate and alkyl methacrylate, wherein said alkyl groups of said fumarate and said methacrylate consist essentially of C_6 to C_{16} straight chain alkyl groups; and

(b) polymers consisting essentially of C_8 to C_{18} alpha monoolefin moieties.

4,175,927

FUEL COMPOSITIONS FOR REDUCING HYDROCARBON EMISSIONS

Leonard M. Niebylski, Birmingham, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed Mar. 27, 1978, Ser. No. 890,494
Int. Cl.[2] C10L *1/18*
U.S. Cl. 44—68 **36 Claims**

1. As a composition of matter, a gasoline for an internal combustion engine comprising

(i) an organomanganese compound, and

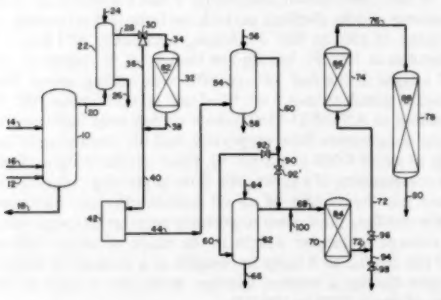
(ii) an exhaust emission reducing amount of a compound selected from a dimer acid, a trimer acid or a mixture of a dimer and trimer acid produced by the polymerization or condensation of an unsaturated aliphatic monocarboxylic acid having between 16 and 18 carbon atoms per molecule.

4,175,928

HYDRODESULFURIZATION PURIFICATION PROCESS FOR COAL GASIFICATION

Michael W. Britton; Eugene A. Harlacher; John N. Dew, all of Ponca City, Okla., and Joseph A. Kleinpeter, McMurray, Pa., assignors to Conoco Methanation Company, Stamford, Conn.

Continuation-in-part of Ser. No. 808,425, Jun. 20, 1977, abandoned, which is a continuation-in-part of Ser. No. 725,761, Sep. 23, 1976, abandoned, which is a continuation-in-part of Ser. No. 637,919, Dec. 5, 1973, abandoned. This application Jul. 27, 1978, Ser. No. 928,339
Int. Cl.[2] C10K *1/20*
U.S. Cl. 48—197 R **6 Claims**



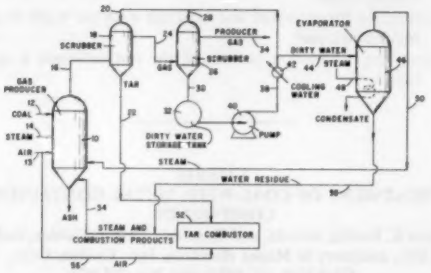
1. In a method for removing organic sulfur compounds selected from the group consisting of carbonyl sulfide, carbon disulfide, mercaptans and thiophenes from a gaseous mixture comprising hydrogen, carbon monoxide and said organic sulfur compounds, said carbon monoxide being present in an amount equal to at least 10 mol percent of said mixture and said hydrogen being present in an amount such that the ratio H_2/CO is from about 2.0 to about 4.0, to produce a gaseous mixture containing less than 0.2 ppmv sulfur by converting said organic sulfur compounds into hydrogen sulfide in the presence of a sulfided catalyst consisting essentially of at least one metal component selected from the group consisting of nickel and nickel compounds and cobalt and cobalt compounds and at least one second metal component selected from the group consisting of molybdenum and molybdenum compounds supported on a suitable catalyst carrier and subsequently removing at least a major portion of the hydrogen sulfide from said gaseous mixture, the improvement comprising adjusting the composition of said gaseous mixture to a hydrogen sulfide content from about 25 to about 100 ppmv and a water content from about 0.1 to about 15 weight percent to produce an adjusted gaseous mixture and contacting said adjusted gaseous mixture with said catalyst at a space velocity from about 1500 to about 5000 hr^{-1} and a temperature from about 425° to about 700° F. without inducing excessive methanation and without desulfurizing the catalyst.

4,175,929

PROCESS FOR CONTROL OF POLLUTANTS GENERATED DURING COAL GASIFICATION

Robert Frumerman, Pittsburgh, and Harold M. Hooper, Sewickley, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 29, 1978, Ser. No. 937,903
Int. Cl.[2] C10J *3/16*
U.S. Cl. 48—202 **6 Claims**



1. A process for converting coal into combustible gases wherein environmental pollutants comprising particulate material and non-aqueous condensable material including tars that are generated during the conversion of the coal and entrained in the combustible gases are essentially eliminated as environmental pollutants by the steps of heating the coal in a gasification chamber in the presence of steam and reactive gas to a temperature sufficient to provide the combustible gases, withdrawing the combustible gases from the gasification chamber, contacting the combustible gases with water in a condensing zone at a temperature above the aqueous dew point to evaporate the water and condense tars in the combustible gases, conveying the resulting essentially water-free liquid tars from the condensing zone to a combustion zone operated at pressure at least as great as that in said gasification chamber, burning the tars in the combustion zone, and conveying the products of combustion from the combustion zone into the gasification chamber.

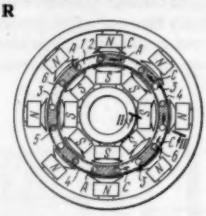
4,175,930
METHOD FOR FINISHING SURFACES OF NON-MAGNETIC ARTICLES BY MEANS OF FERROMAGNETIC ABRASIVE POWDER IN MAGNETIC FIELD

Faddei J. Sakulevich, pereulok Dalny, 3; Leonid K. Minin, ulitsa D. Serdicha, 54, kv. 47; Jury A. Bazarnov, ulitsa Golodeda, 51, korpus, kv. 72; Alexandr A. Baubel, 2 pereulok Bagrationa, 19, kv. 376, and Nikolai Y. Skvorchevsky, ulitsa Karbysheva, 11, kv. 152, all of Minsk, U.S.S.R.

Filed Apr. 27, 1978, Ser. No. 900,517

Int. Cl.[2] B24B *31/00*

U.S. Cl. 51—281 R **6 Claims**



1. A method for finishing surfaces of non-magnetic articles by means of ferromagnetic abrasive powders in a magnetic field which is produced by oppositely positioned unlike poles of a magnetic system, comprising the following: introducing a ferromagnetic abrasive powder in said magnetic field to form a cutting brush from said powder; placing said non-magnetic articles in said magnetic field; causing said articles to be moved relative to said cutting brush; placing a ferromagnetic body between each of said non-magnetic articles and causing said body to move relative to said cutting brush so that the latter is continuously restored.

4,175,931
ABRASIVE MATERIAL AND PROCESS FOR MANUFACTURING THE SAME

Eckart Teschner, Hunstetten-Limbach; Harald Riedel, Mainz, and Richard Sattelmeyer, Schlangenbad-Georgenborn, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Sep. 29, 1977, Ser. No. 837,929

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1976, 2644552

Int. Cl.[2] B24D *3/28*

U.S. Cl. 51—297 **9 Claims**

1. A process for the manufacture of an abrasive material which comprises the steps

(i) applying a basic binder layer to a substantially flat flexible support;

(ii) scattering abrasive particles onto the said basic binder layer;

(iii) drying the product of step (ii) in a horizontal drying unit having an air temperature of from 100° to 140° C. and subsequently cooling the product in an air stream having a temperature of not more than 40° C., the drying process being effected for a time sufficient to allow the said basic binder layer to attain sufficient adhesive strength to prevent displacement of the abrasive particles disposed therein when the product is cooled;

(iv) applying a second binder layer as sizer to the cooled product of step (iii);

(v) drying the sizer in a horizontal drying unit having an air temperature of from 100° to 140° C. and subsequently cooling the product in an air stream having a temperature of not more than 40° C., the drying process being effected for a time sufficient to allow the said sizer to become imprint resistant;

(vi) loosely rolling up the product of step (v); and

(vii) curing the product of step (vi) by gradual heating to 110° to 140° C. followed by gradual cooling to a temperature of about 50° C., wherein the gradual heating and gradual cooling is effected by passing a heating or cooling air stream, as required, substantially axially through the rolled-up product;

wherein the said basic and second binder layers each comprise an aqueous mixture with solids content of at least 55% by weight, based on the total composition, and a viscosity of no more than 5,000 mPa.s of (A) at least one predominantly ortho-structured resol having a molar ratio of phenolic component to formaldehyde of from 1:(1.1 to 2.5), and (B) at least one polyvinyl alcohol in an amount of from 5 to 30% by weight, based on the weight of solid phenolic resin.

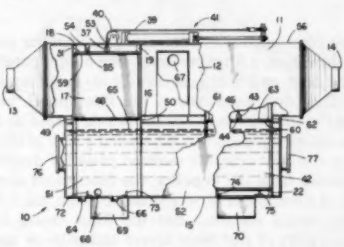
4,175,932
METHOD FOR CONTINUOUS VAPOR RECOVERY

Larry J. Durr, 4714 Lynton Ct., Indianapolis, Ind. 46254; Larry L. Durr, 8707B Pemberton Cir., Indianapolis, Ind. 46260, and B. Jan Clay, 7650 Eagle Valley Pass, Indianapolis, Ind. 46234

Continuation-in-part of Ser. No. 779,471, Mar. 21, 1977, abandoned, which is a continuation of Ser. No. 673,931, Apr. 5, 1976, abandoned. This application Mar. 13, 1978, Ser. No. 886,290

Int. Cl.[2] B01D *53/04*

U.S. Cl. 55—59 **12 Claims**



1. A method for removing material in vapor form from a gas comprising the following steps:

a. flowing the gas containing said material through a charcoal filter, said filter absorbing said material;

b. placing said filter in water to submerge the charcoal in the water;

c. heating said water to vaporize a mixture of said water and said material, whereby substantial movement of the charcoal is produced resulting in an efficient desorption process and the release of fine particles in the filter;

d. collecting the vaporized mixture of said water and said material; and

e. separating and collecting said material from said vaporized mixture.

5. A method for removing material in vapor form from a continuous gas stream comprising the following steps:

a. flowing the gas stream containing said material through first and second charcoal filters, said first and second filters absorbing said material;

b. isolating said first filter from said continuous gas stream, said gas stream continuing to pass through said second filter;

c. placing said first filter in water to submerge the charcoal in the water;

d. heating said water to vaporize a mixture of said water and said material, whereby substantial movement of the charcoal is produced resulting in an efficient desorption process and the release of fine particles in the filter;

e. collecting the vaporized mixture of said water and said material;

f. separating and collecting said material from said vaporized mixture;

g. removing said first filter from said water;

h. flowing the gas containing said material through said first filter, said first filter absorbing said material;

i. repeating steps b through h with said second filter.

4,175,933

DUST FILTER APPARATUS

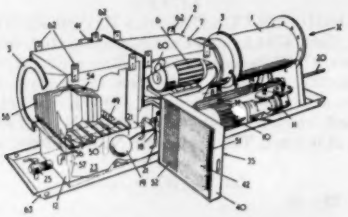
Granville C. James, Ashby-de-la-Zouch, England, assignor to Coal Industry (Patents) Limited, London, England

Continuation of Ser. No. 836,828, Sep. 26, 1977, abandoned. This application Sep. 20, 1978, Ser. No. 944,101

Claims priority, application United Kingdom, Oct. 22, 1976, 43927/76

Int. Cl.[2] B01D *47/00*

U.S. Cl. 55—259 **13 Claims**



1. Dust filter apparatus comprising a chamber providing a gaseous flow duct, a filter unit including a filter panel arranged across the duct, and nozzle means for spraying liquid into the gaseous flow duct upstream of the filter panel, an impeller positioned in the duct between the nozzle means and the filter panel, an inclined plate provided around a wall of the duct, and a drain in the duct near the inclined plate for draining excess water thrown from the impeller, the filter panel comprising a plurality of filter layers arranged side by side, each filter layer extending across the duct and the filter layers comprising alternating pairs of fine filter layers and pairs of coarse filter layers defining at least portions of passageways for liquid flowing down the filter panel between two adjacent filter layers, flow of liquid in the panel tending to be restrained by the filter layers such that in use a liquid curtain is formed across the duct, the pairs of relatively coarse filter layers presenting a lower resistance to downward flow of water than that presented by the pairs of relatively fine filter layers.

4,175,934

CLEAR AIR DEVICE

Arnold Lang, Marburg-Wehrda, and Hans-Peter Hortig, Hattersheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

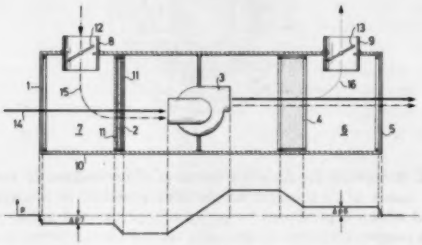
Continuation of Ser. No. 655,412, Feb. 5, 1976, abandoned. This application Dec. 19, 1977, Ser. No. 862,130

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1975, 2505137

Int. Cl.[2] B01D *51/00*

U.S. Cl. 55—267 **3 Claims**

1. A device for drawing and cleansing circulated air from a room and fresh air from the outer atmosphere, the circulated and fresh air being at an atmospheric pressure, and passing a first portion of the cleansed circulated and fresh air back into the room and a second portion of the cleansed circulated and fresh air, as off air, into the atmosphere comprising a hollow casing having within said casing first and second openings which communicate with the outer atmosphere, air inlet grid means, air outlet grid means, a preliminary filter, a high efficiency particulate air filter unit, and means for drawing air into and blowing air out of said casing, said inlet grid means and said preliminary filter being positioned in said casing to define a first chamber therebetween, said first opening providing communication between said first chamber and the outer atmosphere, said means for drawing and blowing air being positioned in said casing between said preliminary filter and said high efficiency particulate air filter unit, said high efficiency particulate air filter unit and said outlet grid means being positioned within said casing to define a second chamber therebetween, said second opening providing communication between the second chamber and the atmosphere, the means for drawing and blowing air first drawing circulated air through the inlet grid means and fresh air through the first opening, next drawing the circulated and fresh air through the preliminary filter and into the means for drawing and blowing air, next blowing the circulated and fresh air out of the means for drawing and blowing air and through the high efficiency particulate air filter unit and finally blowing a first portion through the air outlet grid means and a second portion through the second opening into the outer atmosphere, said means for drawing and



blowing air comprising means for increasing the pressure of the circulated and fresh air entering and being blown out of the means for drawing and blowing air, to a pressure above the atmospheric pressure, said air inlet grid means comprising means for reducing the pressure of circulated air introduced at the air inlet grid means to a pressure below atmospheric pressure before the circulating air exits the inlet grid means and passes into the first chamber and said air outlet grid means comprising means for maintaining the pressure of the cleansed circulated and fresh air blown into said second chamber at a pressure above the atmospheric pressure and reducing the pressure of the first portion of cleansed circulated and fresh air introduced at the air outlet grid means to atmospheric pressure before the first portion exits the outlet grid means and passes back into the room.

4,175,935

PLANAR CONDENSOR ARRAY OF HOLLOW INTERLEAVED PROFILES

Paul Gutermuth, Augustastrasse 48, D-6456 Langenselbold, Fed. Rep. of Germany; Oetjen Heinrich, August-Bebel-Strasse 11, D-6451 Bruchkobel, Fed. Rep. of Germany, and Paul Gutermuth, Jr., Augustastrasse 48, D-6456 Langenselbold, Fed. Rep. of Germany

Filed Sep. 16, 1977, Ser. No. 834,021

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1976, 2641765

Int. Cl.[2] B01D *5/00, 35/18, 45/06*

U.S. Cl. 55—269 **3 Claims**

1. A self-cleaning apparatus for condensing gaseous contaminants and/or precipitating particles entrained in a flowing gaseous mixture, comprising:

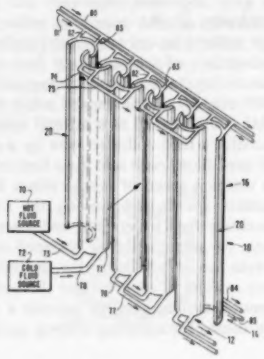
(a) a generally planar condensor array disposed with the plane of the array substantially perpendicular to a flow direction of the gaseous mixture,

(b) said array comprising first and second rows of generally U-shaped, hollow, alternately interleaved, spaced profile elements disposed such that the free edges of the elements in the first row overlap the free edges of the elements in the second row so that the gaseous mixture flows into the array through the spaces between the elements in the first row thereof and is deflected by the elements of the second

row towards the elements of the first row and out of the array through the spaces between the elements in the second row thereof,

(c) an internal heat insulating partition wall within each of said hollow elements, each of said walls being of the same U-shape as said elements to divide the interiors of said elements into two separate chambers,

(d) means for supplying to one of the separate chambers in



each of said hollow elements a fluid at a sufficiently low temperature to form a condensate on the element wall portions in contact with said one of the separate chambers, and

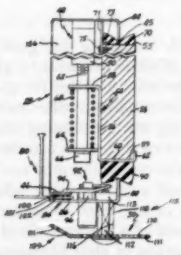
(e) means for supplying to the other of said separate chambers in each of said hollow elements a fluid at a sufficiently high temperature to melt off any condensate on the element wall portions in contact with said other of said separate chambers.

4,175,936

DIFFUSER WITH REPLACEABLE FILTER

Wendell J. Lough, and Donald E. Bishop, both of Hampstead, N.H., assignors to Weber Technical Products Division of Craig Systems Corp., Lawrence, Mass.

Filed Sep. 6, 1977, Ser. No. 830,658
Int. Cl.[2] B01D *35/02*
U.S. Cl. 55—385 A **16 Claims**



11. An improved diffuser unit for supplying clean air to a work area, said unit being of the type including a downwardly opening hood, a filter housing extending around the periphery of said hood and dimensioned to rest on a ceiling support gridwork, and a filter panel having upper and lower peripheral surfaces and being disposed within said filter housing, wherein the improvement comprises:

a first sealing gasket extending all the way around the upper peripheral surface of said filter panel;

a second sealing gasket extending all the way around the lower peripheral surface of said filter panel;

resilient support and clamping means secured to said filter housing and engaging said filter panel for supporting said filter panel within said housing, said housing including a downturned flange extending therearound, said support and clamping means biasing said first gasket into engagement with said downturned flange to thereby define a knife edge seal; and

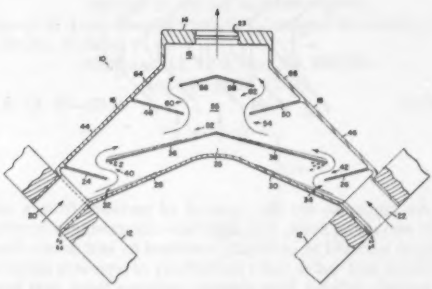
grill means sealingly engaging said housing for defining a knife edge seal with said second sealing gasket and thereby defining a sealed annulus with said filter housing and said filter panel.

4,175,937

GAS-CONTAMINANT SEPARATOR

Steven G. Brandau, and Robert L. Carmichael, both of Cedar Falls, Iowa, assignors to Deere & Company, Moline, Ill.

Continuation-in-part of Ser. No. 685,102, May 10, 1976, abandoned. This application Oct. 20, 1977, Ser. No. 844,019
Int. Cl.[2] B01D *45/06*
U.S. Cl. 55—419 **9 Claims**



5. A separator for separating blow-by combustion gas-oil contaminant mixtures into combustion gas and oil contaminants comprising: an inverted V-shaped housing having a generally inverted V-shaped bottom; said inverted V-shaped housing having an inlet port opening into each leg of said inverted V-shaped housing for receiving flows of the mixtures and having an outlet port opening from the vertex of said inverted V-shaped housing for exhausting combustion gas from said inverted V-shaped housing; said inverted V-shaped housing having first baffle means proximate said inlet ports for directing the mixtures from said inlet ports towards and into contact with one another; said inverted V-shaped housing having second baffle means above said first baffle means cooperating with said inverted V-shaped bottom to cause the mixtures to contact one another and a first portion of the contaminants to be sedimentarily precipitated from the mixtures, said second baffle means cooperating with said first baffle means for causing a first retroversion of the mixtures away from and out of contact with one another so as to centrifugally precipitate a second portion of the contaminants from the mixtures; said inverted V-shaped housing having third baffle means above said second baffle means cooperating therewith for causing a second retroversion of the mixtures towards and into contact with one another; said inverted V-shaped housing having fourth baffle means above said third baffle means cooperating with said third baffle means to cause the mixtures to contact one another and a third portion of the contaminants to be sedimentarily precipitated from the mixtures, said fourth baffle means cooperating with said third baffle means for causing a third retroversion of the mixtures away from and out of contact with one another so as to centrifugally precipitate the remaining portion of the contaminants from the mixtures; said inverted V-shaped housing having inside surfaces cooperating with said fourth baffle means for causing a fourth retroversion of the mixtures towards and into contact with one another.

4,175,938

APPARATUS FOR THE SEPARATION OF LIQUID DROPLETS FROM A GAS STREAM ENTRAINING SAME

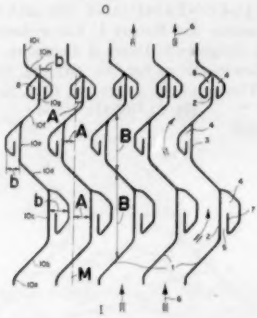
Ulrich Regehr, Süsterfeldstr. 65, 5100 Aachen, Fed. Rep. of Germany; Horst Hannemann, and Ludwig Speitkamp, both of Aachen, Fed. Rep. of Germany, assignors to Ulrich Regehr, Aachen, Fed. Rep. of Germany

Filed Jun. 12, 1978, Ser. No. 914,780

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1977, 2726524

Int. Cl.[2] B01D *45/04*

U.S. Cl. 55—440 **5 Claims**



1. An apparatus for the removal of particles from a gas stream entraining same, said apparatus comprising a housing having an inlet and an outlet and traversed by said stream from said inlet to said outlet, and a multiplicity of separator plates in said housing defining flow passages between them, said flow passages being traversed by said gas stream in a flow direction from said inlet to said outlet, each of said plates being corrugated and having, at least on one side of each plate, alternating corrugation crests separated by a corrugation trough with the crests and troughs of the plates extending transversely to said direction, at least the corrugation crests of said plates being provided with members overhanging the respective crest and defining respective phase-separating chambers having inlet gaps opening into the oncoming gas stream opposite to said direction, the successive crests and troughs of each of said plates away from said inlet toward said outlet having a progressively decreasing amplitude measured perpendicular to a median plane of the respective plate, the trough and crest widths of succeeding troughs and crests in said direction progressively decreasing for each plate, the inlet gaps of each of said phase-separating chambers being formed by a flange extending generally in said direction and into the respective phase-separating chamber to serve as a guide flange and reverse-flow blocking member.

4,175,939

METHOD AND APPARATUS FOR INTRODUCTION OF GLASS FILAMENT STRAND ONTO FEED ROLLER OF CHOPPED GLASS FILAMENT STRANDS MANUFACTURING SYSTEM

Koji Nakazawa; Toshiaki Kikuchi, and Toshihito Fujita, all of Fukushima, Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan

Filed Jun. 30, 1978, Ser. No. 920,836

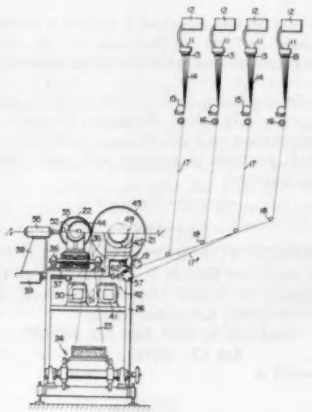
Claims priority, application Japan, Jul. 11, 1977, 52-82855

Int. Cl.[2] C03B *37/02*

U.S. Cl. 65—2 **4 Claims**

1. A method of introducing a strand of glass filaments onto a feed roller or a system for manufacturing chopped strands of glass filaments wherein a multiplicity of glass filaments extruded through orifices in the bottoms of at least two spinning furnaces and applied with a sizing agent are collected to form at least two strands of glass filaments, which are thereafter brought into contact with the circumferential surface of the feed roller through a predetermined angle so as to be drawn and attenuated by frictional force exerted by the contact with the circumferential surface of the feed roller while the strands of glass filaments are cut into chopped strands of a predetermined length with a cutter roller in contact with the circumferential surface of the feed roller, comprising: providing an auxiliary feed roller disposed adjacent one end of said main feed roller in axial alignment therewith and adapted to be driven independently of said main feed roller; providing an auxiliary cutter roller adapted to contact under pressure the circumferential surface of said auxiliary feed roller to rotate therewith; maintaining stationary or driving said auxiliary feed roller at a relatively low rotation speed while rotation of said main feed roller is maintained at a normal attenuation speed; causing said auxiliary feed roller to take up a strand of glass filaments to be introduced onto said main feed roller; gradually increasing the rotation speed of said auxiliary feed roller to a normal attenuation speed; and moving the strand wrapped around said auxiliary feed roller onto said main feed roller.

2. In a system for manufacturing chopped strands of glass filaments wherein the system comprises at least two spinning furnaces having orifices in each bottom thereof for extruding separate streams of molten glass to provide a multiplicity of glass filaments, means for applying a sizing agent to said glass



filaments, means for collecting said glass filaments to form at least two strands of glass filaments, a guide roller having at least two circumferential grooves for guiding said strands in parallel with each other, a feed roller having a circumferential surface for drawing the attenuating said strands from said guide roller by frictional force when the strands are brought into contact with the circumferential surface through a predetermined angle, and a cutter roller adapted to contact the peripheral surface of said feed roller for cutting said strands into chopped strands of a predetermined length, an apparatus for introducing a strand of glass filaments onto said feed roller comprising: an auxiliary feed roller disposed adjacent one end of said main feed roller in axial alignment therewith; means for driving said auxiliary feed roller at a variable speed independently of said main feed roller; an auxiliary cutter roller adapted to contact under pressure the circumferential surface of said auxiliary feed roller to rotate therewith; an auxiliary guide roller for guiding a strand of glass filaments to introduce the strand onto the circumferential surface of said main feed roller; means for moving said auxiliary guide roller parallel with the axis of said main and auxiliary feed rollers from a first position laterally adjacent to said auxiliary feed roller to a second position laterally adjacent to said main feed roller; and means for releasing the strand guided by said auxiliary guide roller therefrom and positioning the release strand in the corre-

sponding circumferential guide groove of said main guide roller when the auxiliary guide roller is moved from said first position to said second position.

4,175,940

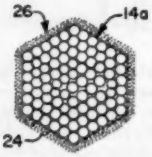
METHOD FOR MAKING FIBER OPTICS FUSED ARRAYS WITH IMPROVED BLEMISH QUALITY

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed Jun. 19, 1978, Ser. No. 916,980

Int. Cl.[2] C03C *23/20, 15/00;* C03B *11/08*

U.S. Cl. 65—4 A **10 Claims**



1. The method of making a fused fiber optics array with improved blemish quality comprising:

tightly juxtapositioning a multiplicity of optical fibers into the overall cross-sectional configuration desired of component building blocks of said array, said juxtapositioned fibers constituting a preform of said building blocks;

covering the sides of said preform with a layer of removable material having a melting temperature and coefficient of expansion compatible with said preform;

heating and drawing said covered preform into a section having a reduced cross-sectional size which corresponds to that desired of said building blocks;

separating a length of said drawn section from said preform;

removing said layer of covering material from said separated length of said drawn section;

dividing said length of said drawn section into a plurality of relatively short building blocks each of a length approximately corresponding to the thickness desired of said fused array;

tightly juxtapositioning said number of said shorter sections;

said step of dividing of said length of said drawn section being performed at a preselected stage between said step of drawing said preform and said step of juxtapositioning said shorter building block sections; and

fusing said tightly juxtapositioned shorter sections together to produce said array.

4,175,941

INTERNAL COATING PROCESS FOR GLASS TUBING

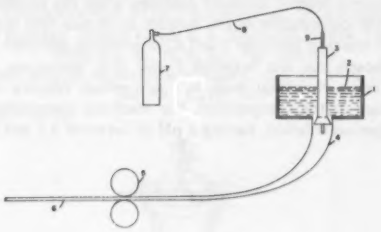
Costas C. Lagos, Danvers; Ricardo A. Lanio, Andover; John L. Crowley, Rowley, all of Mass., and Norman A. Moreau, Hampton, N.H., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Continuation-in-part of Ser. No. 901,177, Apr. 28, 1978, abandoned. This application Oct. 20, 1978, Ser. No. 953,246

Int. Cl.[2] C03C *17/18*

U.S. Cl. 65—60 B **5 Claims**

1. The method of depositing a conductive film of tin oxide on the inner surface of tubular or blown glassware comprising the steps of: drawing hot glass from a glass melt through a bag state where the glass is above its softening temperature; and dispensing into the hot bag an aqueous solution containing tin



chloride and hydrofluoric acid, while the hot bag is being formed into tubing or blown ware.

4,175,942

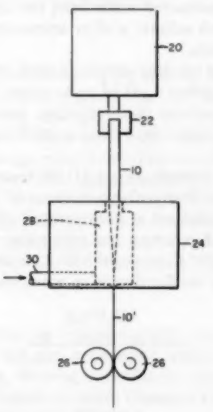
METHOD OF GLASS DRAWING

George D. Lipp, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 12, 1978, Ser. No. 895,539

Int. Cl.[2] C03B *17/00*

U.S. Cl. 65—60 B **4 Claims**



1. A method of drawing glass to form an article comprising, heating a source of glass to at least a semi-molten condition, drawing glass from said heated semi-molten source thereof, introducing water vapor into the atmosphere surrounding the drawing area of said glass and surrounding said newly drawn semi-molten glass with said water vapor, permeating the atmosphere with water vapor in the area wherein said semi-molten drawn glass is being initially formed and prior to rigidifying such glass, and cooling such glass into a rigid article.

4,175,943

WATER-SOLUBLE FERTILIZERS

Pieter J. Jordaan, and Jacobus P. van Deventer, both of Strand, South Africa, assignors to Triomf Fertilizers, Johannesburg, South Africa

Continuation of Ser. No. 534,354, Dec. 18, 1974, abandoned. This application Jan. 18, 1978, Ser. No. 870,451

Claims priority, application South Africa, Dec. 19, 1973, 73/9564

Int. Cl.[2] C05C *9/00*

U.S. Cl. 71—29 **10 Claims**

1. A method of manufacturing water soluble mixed NPK fertilizer composition in solid form comprising the steps of (a) dissolving urea in phosphoric acid to form a urea phosphoric

acid adduct solution, (b) adding one or more potassium salts to said adduct while agitating to form a mixture in solid or slurry form and (c) cooling the mixture thus formed, so as to crystallize the solid soluble fertilizer granules when the mixture is a slurry, the constituents of the mixture so chosen that the final product contains between 5 and 42% nitrogen, between 2 and 15% phosphorus and between 1 and 38% potassium, these values being elemental mass as a percentage relating to the total mass of the composition, the resulting composition, in 10% aqueous solution, having a pH of between 1.2 and 2.0.

4,175,944

REMOVAL OF FLUORINE DURING PRODUCTION OF FERTILIZER

George C. Johnson, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 26, 1978, Ser. No. 918,992
Int. Cl.[2] C05B *11/06, 11/00*
U.S. Cl. 71—39 **4 Claims**

1. An improved process for recovering fluorine liberated during the production of fertilizer by the steps comprising
(1) reacting a phosphate source with nitric acid;
(2) separating unreacted solids from the liquid and reacting the liquid with sulfuric acid or ammonium sulfate to precipitate gypsum;
(3) filtering and reacting ammonia with the filtrate so that the filtrate reaches a pH of up to about 7.0;
(4) filtering to remove the precipitate; and
(5) evaporating water from the step (4) filtrate to recover the fertilizer;
the improvement whereby in step (1) the reaction is carried out at a temperature of from ambient to about 60° C. and in step (2) the reaction is carried out at a temperature of from ambient to about 80° C., and whereby the precipitate from step (4) is heated to about 450° C. to about 550° C. in an ammonia atmosphere to remove the fluorine as an ammonium fluoride.

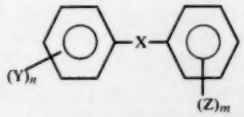
4,175,945

BENZOPHENONES AND BENZHYDROLS

Robert H. Meisinger, Warminster, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 659,609, Feb. 19, 1976, Pat. No. 4,120,687.
This application Apr. 3, 1978, Ser. No. 892,456
Int. Cl.[2] A01N *5/00*
U.S. Cl. 71—78 **5 Claims**

1. A method for controlling the growth of suckers in growing tobacco plants which comprises applying to the plants an effective amount of a compound of the formula



wherein
X is a group of the formula —CHOH—,
each Y and each Z independently is a halogen atom, a (C_1–C_8)alkyl group, a trifluoromethyl group, a (C_1–C_4)alkoxy group, a hydroxy group, a nitro group, or a (C_1–C_4)alkylthio group, m is 0, 1, or 2, and n is 0, 1, 2, or 3.

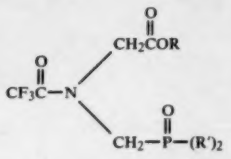
4,175,946

THIO DERIVATIVES OF N-TRIFLUOROACETYL-N-PHOSPHONOMETHYLGLYCINE

John E. Franz, Crestwood, and Robert J. Kaufman, University City, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jul. 10, 1978, Ser. No. 922,900
Int. Cl.[2] A01N *9/36*
U.S. Cl. 71—87 **24 Claims**

1. A compound of the formula



wherein R is an alkyl group containing from 1 to 10 carbon atoms, a chloro lower alkyl group containing from 1 to 4 carbon atoms and 1 to 3 chlorine groups, a lower alkoxy lower alkyl group containing from 3 to 6 carbon atoms or an alkoxyalkoxyalkyl group containing from 5 to 9 carbon atoms and R' is a member of the group consisting of lower alkylthio, lower alkenylthio, benzylthio, phenylthio, or substituted phenylthio wherein the phenyl group contains 1 to 2 substituents selected from the group consisting of halo, lower alkyl and lower alkoxy.

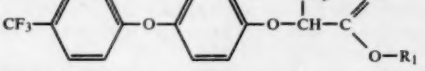
4,175,947

PHENOXY-PHENOXYPROPIONIC ACID ESTERS

Manfred Koch, Kelkheim; Reinhard Handte, Hofheim; Gerhard Hörlein, Frankfurt am Main; Hermann Bieringer, Eppstein, and Peter Langelüddeke, Hofheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

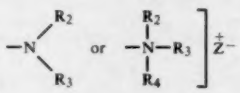
Filed Apr. 21, 1977, Ser. No. 789,673
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1976, 2617804
Int. Cl.[2] A01N *9/24, 9/28;* C07C *69/76;* C07D *307/24*
U.S. Cl. 71—88 **20 Claims**

1. A compound of the formula



I

wherein
R is hydrogen or halogen,
R_1 is
(a) linear or branched (C_1–C_{12})alkyl substituted by phenoxy which may be optionally mono- or trisubstituted by halogen and/or (C_1–C_4)-alkyl, (C_1–C_4)-acyl or a radical of the formulae

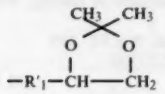


II III

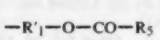
(b) cyclohexenyl or phenyl-(C_3–C_4)-alkenyl;
(c) (C_3–C_4)-alkinyl, which may be mono- or disubstituted by linear or branched (C_1–C_4)-alkyl, phenyl or

halogenophenyl with the proviso that R_1 cannot be an unsubstituted propargyl or butinyl radical;

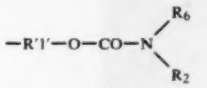
(d) a radical of the formulae



IV

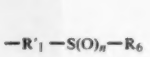


V



VI

or



VII

or

(e) (C_1–C_2)alkyl substituted by furyl, tetrahydrofuryl, or oxiranyl;

R_2 and R_3 are (C_1–C_4)alkyl,

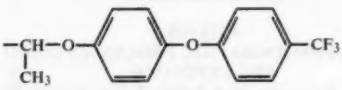
R_4 is (C_1–C_4)alkyl,

Z is the anion of an inorganic acid,

R_1' is linear or branched (C_1–C_{12})alkylene,

R_5 is (C_1–C_4)halogenoalkyl or a radical of the formula

VIII



R_6 is (C_1–C_4)alkyl or phenyl and

n is zero to 2.

14. An herbicidal composition consisting essentially of an inert carrier and an herbicidally effective amount of a compound as defined in claim **1**.

4,175,948

SUBSTITUTED ISOINDOLES

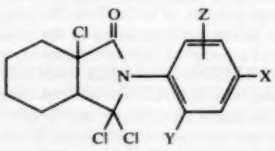
Steven J. Goddard, West Grove, Pa., and George Levitt, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 709,820, Jul. 29, 1976, Pat. No. 4,120,693. This application Jul. 26, 1978, Ser. No. 928,193

Int. Cl.[2] A01N *9/22;* **C07D** *209/46*

U.S. Cl. 71—96 **21 Claims**

1. A compound of the formulae



wherein X is H, F, Cl, Br, CN, NO_2 or OCH_3; Y is H, F or CH_3; and Z is H, F, Cl, Br or OCH_3 provided that

(1) when Y is CH_3, X is F, Cl or Br;

(2) when Z is 6-Cl or 6-Br, Y is F; and,

(3) X, Y and Z may not all be H simultaneously.

8. A composition for the control of undesirable vegetation consisting essentially of a compound of claim **1**, and at least one of (a) a surface-active agent and (b) a solid or liquid diluent.

15. A method for the control of undesirable vegetation comprising applying to the locus of such undesired vegetation a herbicidally effective amount of a compound of claim **1**.

4,175,949

PROCESS FOR PERISHING WASTE RUBBER MATERIALS, ESPECIALLY WORN OUT MOTOR VEHICLE RUBBER TIRES BY RECOVERING THEIR COMPONENTS FOR INDUSTRIAL PURPOSES

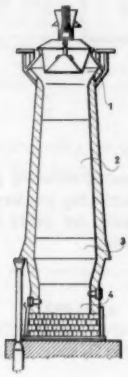
Endre Breznay, Juhasz Gyula u. 6, Budapest H1039, Hungary

Filed Jul. 31, 1978, Ser. No. 929,276

Claims priority, application Hungary, Aug. 15, 1977, BE 1305

Int. Cl.[2] C21B *5/00*

U.S. Cl. 75—42 **5 Claims**



1. In a process for producing pig iron by heating, in a blast furnace, a charge containing iron ore, coke and a slag forming additive, to produce said pig iron and blast furnace gas, wherein the improvement comprises, adding waste rubber material to said charge prior to introduction of the charge into the blast furnace and in an amount sufficient to permit reduction of the specific amount of coke employed in said charge to produce a unit of pig iron and sufficient to increase combustion of the blast furnace gas, said waste rubber material being added in an amount less than 20% of the produced pig iron.

4,175,950

PREPARATION OF PHOSPHORUS CONTAINING METALLIC GLASS FORMING ALLOY MELTS

Robert C. Linares, Warren, and Wiktor Ambasz, Metuchen, both of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Jul. 17, 1978, Ser. No. 925,579

Int. Cl.[2] C22B *9/10*

U.S. Cl. 75—53 **7 Claims**

1. In the process of melting phosphorus-containing glass forming transition metal alloys the improvement which comprises covering the exposed surface of said metal alloy with a layer of a molten flux composition comprising boron trioxide of at least about 95 weight percent purity.

4,175,951

METHOD AND APPARATUS FOR PREPARING A REDUCING GAS STREAM

Charles A. Rubio, Houston, Tex., assignor to CVG-Siderurgica del Orinoco, C.A., Venezuela

Filed May 11, 1978, Ser. No. 904,977

Int. Cl.[2] C22B *5/12*

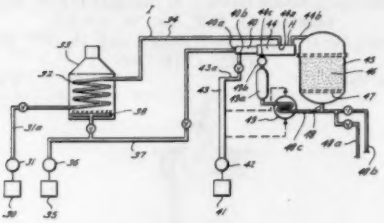
U.S. Cl. 75—91 **11 Claims**

1. A method of producing a stream of hot reducing gas for introduction of said hot reducing gas into a vessel containing comminuted ore oxides to produce reduced metal, comprising the steps of:

combusting a fuel with air in such proportions to produce a heating gas having an absence of free oxygen; and

directing said heating gas and an initially preheated reducing

gas stream to a mixing zone to mix said heating gas with said preheated reducing gas to produce a hot reducing gas stream at a temperature below the fusion point of such ore oxides without spending any of the reducing constituents



in said initially preheated reducing gas stream for introduction of said hot reducing gas stream into such vessel containing comminuted ore oxide to convert said ore oxides to reduced metal.

4,175,952

RECOVERY OF IRON AND TITANIUM METAL VALUES

William K. Tolley, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jul. 19, 1978, Ser. No. 925,902

Int. Cl.[2] C21B *15/00*; C01G *23/04*

U.S. Cl. 75—101 R **9 Claims**

1. A process for the recovery of iron values and titanium values from ilmenite which comprises the steps of:

(a) crushing said ilmenite;

(b) subjecting said crushed ilmenite to a reductive roast at a temperature of from about 600° to about 1000° C. in the presence of hydrogen, carbon monoxide, or a mixture of carbon monoxide and hydrogen;

(c) leaching the resultant reduced ilmenite with a leach solution comprising hydrogen chloride;

(d) separating insoluble gangue from the soluble metal chlorides;

(e) precipitating titanium dioxide from the soluble metal chlorides by treatment with ferric oxide;

(f) separating said titanium dioxide from soluble iron chloride and recovering said titanium dioxide;

(g) reducing the temperature of the soluble iron chloride sufficiently to crystallize the iron chloride;

(h) reducing a major portion of said iron chloride to form metallic iron and hydrogen chloride and recovering the metallic iron;

(i) oxidizing the other portion of said iron chloride to form ferric oxide; and

(j) recycling said ferric oxide to step (e) of the process.

4,175,953

NON-PRECIOUS DENTAL ALLOY OF CO-NI-CR CONTAINING SI AND B

Robin F. Jones, Titusville, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Jun. 29, 1978, Ser. No. 920,430

Int. Cl.[2] C22C *30/00, 19/05*

U.S. Cl. 75—134 F **9 Claims**

1. A dental alloy of good polishability and useful in the fabrication of dental prosthetic devices such as crowns and bridges which have a porcelain covering bonded thereto consisting essentially of from 13 to 25 percent Cr, 20 to 40 percent Ni, 3 to 7.5 percent Mo, 0.2 to 1 percent B, 2.75 to 5 percent Si, less than 5 percent Mn and from 30 to 60 percent Co, by weight.

4,175,954

SELF-DISINTEGRATING RANEY METAL ALLOYS

Laurance L. Oden, Salem, and James H. Russell, Corvallis, both of Oreg., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 24, 1978, Ser. No. 927,235

Int. Cl.[2] C22C *21/00*

U.S. Cl. 75—138 **11 Claims**

10. A self-disintegrating nickel-aluminum alloy comprising about 49.6 weight percent nickel, about 49.6 weight percent aluminum and about 0.8 weight percent carbon with the nickel, aluminum, and carbon being present in the alloy as an aluminum carbide phase, a Ni_2Al_3 phase, a $NiAl_3$ phase and a Al-$NiAl_3$ eutectic phase.

4,175,955

ELECTROPHOTOGRAPHIC PROCESSES USING A PRE-EXPOSURE

Kuniki Seino, Kawasaki; Shoji Kondo, Tokyo; Susumu Tanaka, and Takashi Sugiyama, both of Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 20, 1977, Ser. No. 834,972

Claims priority, application Japan, Sep. 24, 1976, 51-114897; Oct. 27, 1976, 51-144858[U]

Int. Cl.[2] G03G *13/22, 13/04*

U.S. Cl. 430—35 **5 Claims**

1. An electrophotographic process for repetitively forming an electrostatic latent image corresponding to an original onto a photosensitive member having hysteresis characteristics in which the photosensitivity of said photosensitive member in an image exposing step varies in accordance with the exposing and/or charging level of previous latent image forming steps, comprising the steps of:

pre-exposing said photosensitive member with an exposure level greater than 10^3 lx-sec;

uniformly charging said photosensitive member with a specific charge polarity to a predetermined surface potential;

uniformly exposing said photosensitive member with light of a predetermined exposure level;

uniformly charging said photosensitive member with the same charge polarity as in the first charging step; and

exposing the image corresponding to the original onto the uniformly charged photosensitive member, whereby influence from said hysteresis characteristics is avoided by said pre-exposing step and the first uniform charging and exposing steps enable a predetermined specific history to be formed on said photosensitive member to obtain increased and constant photosensitivity.

4,175,956

ELECTROPHOTOSENSITIVE MATERIALS FOR MIGRATION IMAGING PROCESSES

Neil F. Haley, Fairport, N.Y.; James J. Krutak, Kingsport, Tenn., and Robert J. Ott, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

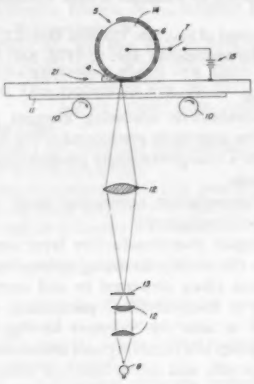
Filed Feb. 10, 1978, Ser. No. 876,795

Int. Cl.[2] G03G *17/04*

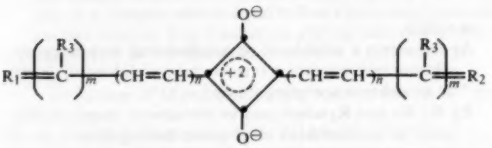
U.S. Cl. 430—37 **3 Claims**

1. An electrophoretic migration imaging process which

comprises subjecting an electrically photosensitive colorant material positioned between at least two electrodes to an applied electric field and exposing said materials to an image



pattern of radiation to which the material is photosensitive, thereby obtaining image formation on at least one of said electrodes, characterized in that at least a portion of said electrophotosensitive material has the structure:



wherein

R_1 and R_2, which may be the same or different, represent a monovalent or divalent substituted or unsubstituted 5 to 13 member heterocyclic nucleus or a substituted or unsubstituted 5 to 10 member saturated or unsaturated carbocyclic nucleus and said hetero atom is selected from the group consisting of O and N;

R_3 represents H, alkyl, aryl, or cyano and carboxy-esters;

m represents 0 or 1; and

n represents 0, 1, 2 or 3; and

said substituted R_1 and R_2 substituents are selected from the group consisting of alkyl, hydroxy, phenyl, oxo, benzyl, carbamoyl, acetamido, nitro, piperidinyl, halo, and substituted amino.

4,175,957

ELECTROPHOTOGRAPHIC PROCESS USING INSULATING DOT OVERLAYER

Eiichi Sato, Tama, Japan, assignor to Olympus Optical Company Limited, Tokyo, Japan

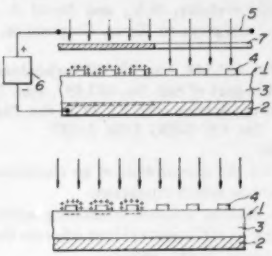
Filed Dec. 22, 1977, Ser. No. 863,167

Claims priority, application Japan, Jan. 14, 1977, 52/2360

Int. Cl.[2] G03G *13/24*

U.S. Cl. 430—31 **3 Claims**

1. An electrographic process comprising using a photosensitive screen consisting of an electrically conductive support, a photoconductive member coated on the electrically conductive support and a dot-, line- or mesh-shaped insulating member coated on the surface of the photoconductive member, said photoconductive member being exposed to the ambient atmosphere through said insulating member, uniformly charging said photosensitive screen and at the same time illuminating said photosensitive screen by a light image, and uniformly exposing said photosensitive screen to light so as to produce,



on said insulating member only, an electrostatic latent image corresponding to said light image.

4,175,958

DRY PLANOGRAPHIC PRINTING METHOD AND PLATE MADE BY ELECTROPHOTOGRAPHIC METHOD USING CONDUCTIVE TONER

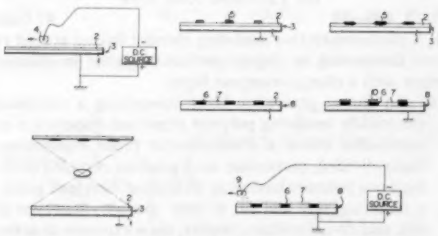
Tsutomu Naganuma, Funabashi; Hisao Hoshi, Tokorozawa; Hiroji Kumagai, Narashino, and Kaneki Yoshida, Kodaira, all of Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

Filed Dec. 20, 1977, Ser. No. 862,607

Claims priority, application Japan, Dec. 23, 1976, 51/155474; Sep. 8, 1977, 52/108196

Int. Cl.[2] G03G *13/26*

U.S. Cl. 430—49 **4 Claims**



1. A dry planographic printing method comprising charging the surface of a dry planographic printing plate, reversal-developing said printing plate by means of a toner, transferring said toner to a transfer material, and fixing said toner; said dry planographic printing plate being prepared by charging and image-exposing a photosensitive plate including an electrically conductive support and a photoconductive layer formed on said support, said photoconductive layer comprising a resin binder and a photoconductive powder dispersed in said binder; and then developing said photosensitive plate by means of a conductive toner and fixing said conductive toner.

2. A dry planographic printing method according to claim 1, wherein said photoconductive layer consists essentially of said resin binder and said photoconductive powder disbursed in said binder.

4,175,959

PRECIPITATION OF PARTICULATE TRIGONAL SELENIUM FOR USE IN ELECTROPHOTOGRAPHY

Ronald E. Karam, Webster, N.Y., and David J. Swarthout, Allston, Mass., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 607,648, Aug. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 481,587, Jun. 21, 1974, abandoned. This application Dec. 23, 1976, Ser. No. 753,957

Int. Cl.[2] G03G *5/08, 5/087*

U.S. Cl. 430—134 **7 Claims**

1. A method for the preparation of an electrostatographic photosensitive device which comprises:

(a) forming an alkaline solution containing selenide and/or polyselenide ions and hydroxyl ions wherein the hydroxyl ions are in stoichiometric excess;

(b) maintaining the solution at a temperature not in excess of 70° C.;

(c) adding an oxidizing agent to the solution to oxidize the selenide and/or polyselenide ions to thereby form and precipitate elemental selenium, said addition being carried out at a rate sufficient to cause the precipitation of submicron, generally spherically shaped particles of trigonal selenium;

(d) separating the particles of trigonal selenium from the solution;

(e) dispersing the particles of trigonal selenium with an electrically active or insulating organic resin in a solvent to form a uniform dispersion;

(f) applying the dispersion to a substrate in an even layer;

(g) removing the solvent from the layer to form a smooth continuous binder layer of trigonal selenium dispersed in a matrix of the organic resin.

4,175,960

MULTI-ACTIVE PHOTOCONDUCTIVE ELEMENT HAVING AN AGGREGATE CHARGE GENERATING LAYER

Martin A. Berwick, Kendall; Charles J. Fox, and William A. Light, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 534,979, Dec. 20, 1974, abandoned. This application Dec. 9, 1975, Ser. No. 639,039

Int. Cl.[2] G03G *5/06, 3/14*

U.S. Cl. 430—58 **47 Claims**

1. A photoconductive insulating element having at least two layers comprising a charge-generation layer in electrical contact with a charge-transport layer,

(a) said charge-generation layer comprising a continuous, electrically insulating polymer phase and dispersed in said continuous phase a discontinuous phase comprising a finely-divided, particulate co-crystalline complex of (i) at least one polymer having an alkylidene diarylene group in a recurring unit and (ii) at least one pyrylium-type dye salt, said co-crystalline complex, upon exposure to activating radiation for said complex, capable of generating and injecting charge carriers into said charge-transport layer, the particulate, co-crystalline complex of said discontinuous phase having a size of about 0.01 to about 25 microns, said charge generation layer having a maximum radiation absorption at a wavelength at least about 10 nm. different from the wavelength of maximum absorption of said pyrylium-type dye salt solubilized with said alkylidene diarylene group-containing polymer in a homogeneous composition,

(b) said charge-transport layer being an organic composition free from said co-crystalline complex and said pyrylium-type dye salt, and comprising as a charge-transport material an organic photoconductive material capable of accepting and transporting injected charge carriers from said charge-generation layer.

4,175,961

MULTI-ACTIVE PHOTOCONDUCTIVE ELEMENTS

Hal E. Wright, Rochester, and Martin A. Berwick, Kendall, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 753,390, Dec. 22, 1976, Pat. No. 4,111,693. This application Apr. 3, 1978, Ser. No. 892,640

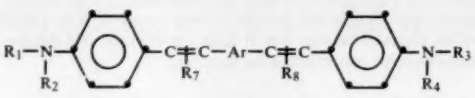
Int. Cl.[2] G03G *5/06, 5/14*

U.S. Cl. 430—58 **11 Claims**

1. A photoconductive insulating element comprising a charge-generation aggregate photoconductive layer in electrical contact with a charge-transport photoconductor containing layer, wherein:

(a) said photoconductor containing layer, comprises an organic photoconductors;

(b) said aggregate photoconductive layer comprising (i) a continuous, electrically insulating polymer phase and (ii) a discontinuous phase dispersed in said continuous phase comprising a finely-divided, particulate, co-crystalline complex of at least one polymer having an alkylidene diarylene group in a recurring unit and at least one pyrylium-type dye salt, and (iii) at least one compound having the structure:



in which

Ar represents a substituted or unsubstituted arylene group, wherein said substituent is an electron withdrawing group or an electron accepting group;

R_1, R_2, R_3, and R_4 which may be the same or resent a substituted or unsubstituted alkyl group having from 1 to 18 carbon atoms or a substituted or unsubstituted aryl group; and

R_7 and R_8, which may be the same or different represent an electron withdrawing group or hydrogen except that when Ar is unsubstituted phenylene or unsubstituted anthrylene, R_7 and R_8 must be other than hydrogen.

4,175,962

ELECTROSTATOGRAPHIC TONER MATERIAL

Shigeru Sadamatsu, Odawara; Tooru Nozaki; Yoshihiko Yamada, both of Minami-ashigara, and Tsuneo Noami, Odawara, all of Japan, assignors to Rank Xerox, Ltd., London, United Kingdom

Filed Oct. 12, 1976, Ser. No. 731,075

Claims priority, application Japan, Mar. 22, 1976, 51-029851

Int. Cl.[2] G03G *9/10*

U.S. Cl. 430—109 **10 Claims**

1. An electrostatographic developer mixture comprising finely-divided toner particles electrostatically clinging to the surface of carrier particles, said toner particles comprising from between about 1 percent and about 20 percent by weight of a colorant based on the weight of said particles, and at least about 60 percent by weight, based on the weight of said toner particles, of a homogeneous resin mixture consisting essentially of between about 40 and about 90 parts by weight of a styrene resin and from about 10 to about 60 parts by weight of an epoxy resin, said styrene resin having a molecular weight of between about 1,000 and about 30,000, and said epoxy resin having a molecular weight of between about 500 and about 10,000.

4,175,963

METHOD OF EXPOSING AND CURING AN EPOXY COMPOSITION CONTAINING AN AROMATIC ONIUM SALT

James V. Crivello, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 638,994, Dec. 9, 1975, Pat. No. 4,069,055, which is a continuation of Ser. No. 466,378, May 2, 1974, abandoned. This application Sep. 30, 1977, Ser. No. 838,153

Int. Cl.[2] G03C 5/04, 1/68

U.S. Cl. 430—296 7 Claims

1. A method for effecting the cationic polymerization of epoxy resin which comprises,

(1) forming a mixture consisting essentially of epoxy resin and an effective amount of a radiation sensitive aromatic onium salt of a Group Va element of the formula,

$$[(R)_a(R^1)_b(R^2)_cX]_d^+[MO_e]^{-(e-f)},$$

which is capable of effecting the cure of such mixture when exposed to radient energy,

(2) exposing said mixture to radiant energy to effect the cure of the organic material,

where R is a monovalent aromatic organic radical selected from carbocyclic radicals and heterocyclic radicals, R^1 is a monovalent organic aliphatic radical selected from alkyl, alkoxy, cycloalkyl and substituted derivatives thereof, R^2 is a polyvalent organic radical forming an aromatic heterocyclic or fused ring structure with X, X is a Group Va element selected from N, P, As, Sb and Bi, M is a metal or metalloid, Q is a halogen radical, a is a whole number equal to 0 to 4 inclusive, b is a whole number equal to 0 to 2 inclusive, c is a whole number equal to 0 to 2 inclusive, and the sum of a+b+c is a value equal to 4 or the valence of X,

d=e–f

f=valence of M and is an integer equal to from 2 to 7 inclusive

e is >f and is an integer having a value up to 8.

4,175,964

METHOD OF MAKING A LITHOGRAPHIC PRINTING PLATE

Toshio Uchida; Yorimiti Yabuta, and Teppei Ikeda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jun. 7, 1977, Ser. No. 804,481

Claims priority, application Japan, Jun. 7, 1976, 51-66353

Int. Cl.[2] G03C 11/12, 5/00, 1/94

U.S. Cl. 430—253 14 Claims

1. In a process for preparing a lithographic printing plate which comprises (1) preparing a light-sensitive lithographic printing plate precursor comprising a metal support having thereon, in succession, a light-sensitive composition layer and a transparent film, said light-sensitive composition layer having a stronger adhesion to one of said support and said film than the other one in its unexposed state and having a stronger adhesion to said the other one than said one in its exposed state, by coating said light-sensitive composition layer on said support and then placing said transparent film over said light-sensitive composition layer and thereafter (2) imagewise exposing said precursor and (3) peeling said imagewise exposed precursor apart to remove, together with said film, areas which have a stronger adhesion to said film in said imagewise exposed light-sensitive composition layer by utilizing the difference in adhesion to said support and to said film between the exposed areas and the unexposed areas of said light-sensitive composition layer, whereby to obtain the lithographic printing plate, the improvement which comprises prior to said coating, subjecting the surface of said support to be adjacent said light-sensitive composition layer to an anodic oxidation treatment and then treating said surface successively with (1) an aqueous solution containing phosphoric acid, and (2) an aqueous solution containing at least one water soluble silicic acid or salt thereof selected from the group consisting of a silicic acid or silicic acid salt and then coating the treated surface with said light-sensitive composition layer.

4,175,965

OFFSET PRINTING PLATE

Akio Yoshida; Yasuo Tsubai, and Seigo Ebato, all of Nagaoka-kyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

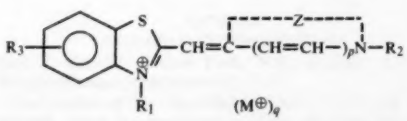
Filed Oct. 27, 1977, Ser. No. 846,024

Claims priority, application Japan, Nov. 1, 1976, 51-131371; Sep. 26, 1977, 52-115299

Int. Cl.[2] G03C 5/54, 1/48

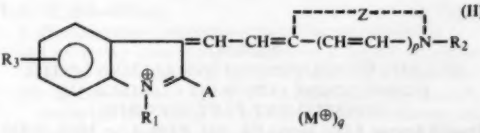
U.S. Cl. 430—230 14 Claims

1. In a direct offset printing plate which cmprises a support of a waterproof paper or synthetic resin film the surface of which is rendered hydrophillic and on which are coated a photographic emulsion layer mainly composed of a silver halide emulsion and a film layer which contains nuclei for physical development and to which an image formed in said emulsion layer is transferred from the emulsion layer comprising a direct positive silver halide emulsion which comprises silver chlorobromide, silver iodobromide, silver chloroiodobromide or silver bromide grains containing at least 80 mol % of bromide, the surface of which has an electron acceptor and at least one sensitizing dye selected from the group consisting of those having the following general formula (I):



(I)

and those having the following general formula (II):



(II)

(wherein Z represents non-metal atom group necessary to complete a 5- or 6-membered nitrogen-containing heterocyclic nucleus, at least one of R_1 and R_2 represents a sulfoalkyl group of 1–5 carbon atoms or a carboxyalkyl group of 1–5 carbon atoms and the remainder of R_1 and R_2 represent an alkyl group of 1–5 carbon atoms, a substituent-containing alkyl group of 1–5 carbon atoms, an aralkyl group, an aryl group or an alkenyl group of 1–5 carbon atoms, R_3 represents nitro group, a halogen atom or hydrogen atom, A represents an aryl group, M represents an alkali metal atom or ammonium group and p and q each represents each represents 0 or 1) and which is fogged with a compound of a metal more electropositive than silver without a reducing agent and wherein said film layer containing nuclei for physical development has a thickness less than 20–30 A.

4,175,966

LIGHT-SENSITIVE BLACK-WHITE SILVER HALIDE PHOTOGRAPHIC MATERIAL FOR FORMING A HIGH-CONTRAST SILVER IMAGE AND METHOD OF TREATING THEREOF

Mitsuto Fujiwhara; Syunji Matsuo; Toyoaki Masukawa; Yutaka Kaneko, and Mikio Kawasaki, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 710,385, Aug. 2, 1976, abandoned. This application Oct. 4, 1978, Ser. No. 948,539

Claims priority, application Japan, Aug. 2, 1975, 50-94295

Int. Cl.[2] G03C *5/30, 1/06, 1/28*

U.S. Cl. 430—438 5 Claims

1. A method of forming a high-contrast black and white silver image by use of a light-sensitive silver halide photographic material having a support and a hydrophilic colloidal layer thereon which method comprises imagewise exposing said photographic material to light and processing said exposed photographic material by a developer having superadditivity and a pH value of 8.5 to 12.5 and containing hydroquinone-metol or hydroquinone-phenidone, said photographic material containing at least one substantially non-diffusible compound capable of oxidizing hydrquinone, said substantially non-diffusible compound being selected from the group consisting of: N-chloro-p-dodecylbenzenesulfonamide sodium; N-chloro-p-nonylbenzenesulfonamide sodium; 2-dodecylbenzoquinone, 2,5-dioctylbenzoquinone; 2-dodecyl-5-methylbenzoquinone; 2-(benzothiazol-2-yl)-3-phenyl-5-dodecyl-2H-tetrazolium bromide; 2,3-diphenyl-5-(4-t-octyloxyphenyl)-2H-tetrazolium chloride; stearic peracid; palmitic peracid; tetraphenylphosphonium bichromate; tetraphenylphosphonium permanganate; tetraphenylarsonium perchromate; and a salt of an anion and a cation, said anion being selected from the group consisting of: p-dodecylbenzenesulfonic acid anion, lauryl sulfate anion, di-2-ethylhexyl sulfosuccinic acid anion, ethylpolyethenoxy sulfate anion, stearic acid anion, and said cation being selected from the group of a tetrazolium cation, a triazolium cation, 1,1′-dimethyl-4,4′-bipyridinium, 1,1′-diethyl-4,4′-bipyridinium and 1,1′-dibenzyl- 4,4′-bipyridinium.

4,175,967

MULTIPART PHOTOSENSITIVE ELEMENT WITH INDEPENDENT CONTRAST CONTROL OF CONSTITUENT PART RECORDS

Donald Krause, 5 Old Towne Rd., Apt. #236, Ayer, Mass. 01432

Filed Nov. 1, 1977, Ser. No. 847,583

Int. Cl.[2] G03C *1/76, 3/00*

U.S. Cl. 430—503 10 Claims

1. A multipart photosensitive element comprising: a support; a plurality of partial record portions carried on said support; all of said partial record portions together forming a full record; each of said partial record portions having a preselected density range of said full record and all of said partial record portion densities combined forming the total density range of said full record; each of said partial record portions including a variable contrast emulsion for varying the contrast of that partial record portion over its preselected density range; each of said variable contrast emulsions being photoresponsive in a different spectral region from the other emulsions in the other partial record portions for independently selectively varying the contrast in each of the partial record portions.

4,175,968

COLOR PHOTOGRAPHIC MATERIALS CONTAINING ANTI-FOGGING AGENTS

Hans-Heinrich Credner, Hohenschaeftlarn, and Karl-Wilhelm Schranz, Odenthal, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

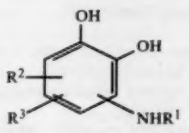
Filed Jul. 17, 1978, Ser. No. 925,226

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1977, 2732971

Int. Cl.[2] G03C *1/40, 1/06*

U.S. Cl. 430—559 4 Claims

1. Light sensitive color photographic material comprising at least one silver halide emulsion layer, containing in at least one of its light sensitive or non-light-sensitive layers a non-diffusing antistaining agent corresponding to the following formula:



in which

R^1 represents an acyl group rendering the compound resistant to diffusion derived from aliphatic or aromatic carboxylic acids or sulphonic acids, including aliphatic or aromatic carbamic acids or carbonic acid monoesters;

R^2 and R^3 which may be the same or different represent hydrogen or substituents selected from the group consisting of alkyl having 1 to 4 carbon atoms, halogen such as chlorine, sulpho, carboxyl.

4,175,969

ANTISTATIC PHOTOGRAPHIC X-RAY FILM HAVING A UNIFORM PROTECTIVE SURFACE COATING OF SURFACTANT OLIGOMER OF TETRAFLUOROETHYLENE

E. Scudder Mackey, Binghamton, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Mar. 17, 1978, Ser. No. 887,763

Int. Cl.[2] G03C *1/38*

U.S. Cl. 430—539 2 Claims

1. An X-ray sensitive photographic element having an antistatic and protective layer thereon which is a uniform, coatable, non-photoactive gelatin-containing composition exhibiting an excellent sensitometric response comprising about 1 to about 3.5% by weight, based upon the gelatin content of said composition, of a fluorocarbon surfactant which is a mixture of low molecular weight oligomers of tetrafluoroethylene having hydrophilic fluorocarbon branching in the fluorocarbon chain, wherein said oligomers have the formula $(C_2F_4)_n$, where n is 4, 5 or 6, and comprise primarily the pentamer oligomer.

4,175,970

PROCESS FOR SENSITIZING PHOTOGRAPHIC SILVER HALIDE EMULSIONS

Raymond J. LeStrange, Hendersonville, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

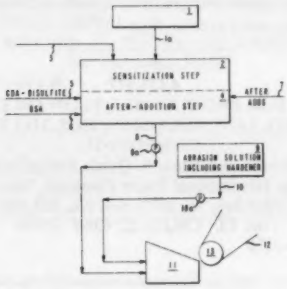
Filed Jul. 24, 1978, Ser. No. 927,050

Int. Cl.[2] G03C *1/78, 1/28*

U.S. Cl. 430—529 9 Claims

1. A process for the sensitization of a light-sensitive gelatino-silver halide emulsion prior to coating it upon a support, in which process the gelatino-silver halide emulsion is made up in a supply vessel and subsequently introduced into a coater for application to a film support, the improvement which comprises adding to the emulsion in the supply vessel (1) either glutaraldehyde bisulfite, succinaldehyde bisulfite, or a substituted glutaraldehyde bisulfite, in a concentration of between

0.05 and 0.3% by weight, based on the weight of total gelatin in the emulsion, and (2) an aromatic sulfinic acid, or a water-



soluble salt thereof, in a concentration of 0.5 to 15 grams per mole of silver halide in the emulsion.

4,175,971
LIGHT-SENSITIVE PHOTOPOLYMERIZABLE COMPOSITION

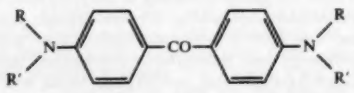
Fumiaki Shinozaki; Yasuo Washigawa; Tomoaki Ikeda; Sho Nakao, and Syunichi Kondoh, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sep. 13, 1977, Ser. No. 832,864
Claims priority, application Japan, Sep. 14, 1976, 51-110151
Int. Cl.[2] G03C *1/68;* C08F *2/46*
U.S. Cl. 430—287 **6 Claims**

1. A light-sensitive composition consisting essentially of at least one ester of an ethylenically unsaturated double bond-containing organic acid and an aliphatic polyhydric alcohol, said ester having a molecular weight of about 1000 or less, and a photopolymerization initiator, said photopolymerization initiator consisting essentially of a combination of the components

(1) benzanthrone, a benzanthrone substituted with one or more of halogen atoms, alkyl groups having 1 to 5 carbon atoms or alkoxy groups having 1 to 5 carbon atoms, a 1,2-benzanthraquinone or a benzanthraquinone substituted with one or more of halogen atoms, alkyl groups having 1 to 5 carbon atoms or alkoxy groups having 1 to 5 carbon atoms, or a mixture thereof and

(2) a compound represented by the formula (a):



(a)

wherein R and R', which may be the same or different, each represents a methyl group or an ethyl group, wherein the weight ratio of component (1) to component (2) of said photopolymerization initiator ranges from about 10:1 to about 1:100 and the amount of said photopolymerization initiator ranges from about 0.1 to about 20% by weight to the weight of the ester.

4,175,972
CURABLE EPOXY COMPOSITIONS CONTAINING AROMATIC ONIUM SALTS AND HYDROXY COMPOUNDS

James V. Crivello, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 638,982, Dec. 9, 1975, Pat. No. 4,058,401, which is a continuation of Ser. No. 466,374, May 2, 1974, abandoned. This application Oct. 6, 1977, Ser. No. 840,092
The portion of the term of this patent subsequent to Nov. 15, 1994, has been disclaimed.
Int. Cl.[2] G03C *1/68;* C03F *8/18;* C08F *2/46*
U.S. Cl. 204—159.18 **8 Claims**

1. Photocurable compositions consisting essentially of

(A) an epoxy resin polymerizable to a higher molecular weight state containing a hydroxy functional flexibilizer, and

(B) from 0.1% to 15% by weight of a radiation sensitive aromatic onium salt of a Group VIa element capable of effecting the cure of (A) by exposure to radiant energy,

where the radiation sensitive aromatic onium salt has the formula,

$$[(R)_a(R^1)_b(R^2)_cX]_d^+[MQ_e]^{-(e-f)},$$

R is a monovalent aromatic organic radical, R^1 is a monovalent organic aliphatic radical selected from alkyl, cycloalkyl and substituted alkyl, R^2 is a polyvalent organic radical forming a heterocyclic or fused ring structure selected from aliphatic radicals and aromatic radicals, X is a Group VIa element selected from sulfur, selenium and tellurium, M is a metal or metalloid, Q is a halogen radical, a is a whole number equal to 0 to 3 inclusive, b is a whole number equal to 0 to 2 inclusive, c is a whole number equal to 0 or 1 where the sum of a+b+c is a value equal to 3 or the valence of X,

d=e−f,

f=valence of M and is an integer equal to from 2 to 7 inclusive,

e is >f and is an integer having a value up to 8.

4,175,973
CURABLE COMPOSITIONS

James V. Crivello, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 638,994, Dec. 9, 1975, Pat. No. 4,069,055, which is a continuation of Ser. No. 466,378, May 2, 1974, abandoned. This application Oct. 27, 1977, Ser. No. 845,928
Int. Cl.[2] G03C *1/68*
U.S. Cl. 204—159.14 **14 Claims**

1. Photocurable compositions consisting essentially of

(A) an epoxy resin polymerizable to a higher molecular weight state containing modifying reactive alcohols and

(B) an effective amount of a radiation sensitive aromatic onium salt of a Group V*a* element capable of effecting the cure of (A) when exposed to radiant energy where the aromatic onium salt of a Group Va element has the formula,

$$[(R)_a(R^1)_b(R^2)_cX]_d^+[MO_e]^{-(e-f)}$$

where R is a monovalent aromatic organic radical selected from carbocyclic radicals and heterocyclic radicals, R^1 is a monovalent organic aliphatic radical selected from alkyl, alkoxy, cycloalkyl and substituted derivatives thereof, R^2 is a polyvalent organic radical forming an aromatic heterocyclic or fused ring structure with X, X is a Group V*a* element selected from N, P, As, Sb and Bi, M is a metal or metalloid, Q is a halogen radical, a is a whole number equal to 0 to 4 inclusive, b is a whole number equal to 0 to 2 inclusive, c is a whole number equal to 0 to 2 inclusive and the sum of a+b+c is a value equal to 4 or the valence of X,

d=e−f,

f=valence of M and is an integer equal to from 2 to 7 icnlusive,
e is >f and is an integer having a value up to 8.

4,175,974
SLIDING SHUTTERS OF BASIC REFRACTORY MATERIAL

Bernd E. Grabner, and Mario G. Heinricher, both of Carinthia, Austria, assignors to Oesterreichisch-Amerikanische Magnesit Aktiengesellschaft, Carinthia, Austria

Continuation of Ser. No. 703,366, Jul. 8, 1976, abandoned. This application Jul. 19, 1977, Ser. No. 817,351
Claims priority, application Austria, Jul. 16, 1975, 5481/75
Int. Cl.[2] C04B *35/04, 35/42*
U.S. Cl. 106—58 **4 Claims**

1. In a combination comprising a vessel for receiving molten metals, said vessel having a discharge opening and a sliding shutter for opening and closing said opening, the improvement comprising:

said sliding shutter consisting essentially of a chemically bonded, unfired, basic refractory material selected from the group consisting of magnesia and magnesia-chromite mixtures, the basic refractory material having an MgO content of 55 to 98.5%, said sliding shutter having substantially greater resistance to thermal shock when subjected to a torch test than a fired sliding shutter or a sliding shutter made by melt casting of the same composition.

4,175,975
AQUEOUS SUSPENSIONS

Dalton C. MacWilliams, Alamo, Calif., and James R. Wirt, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 644,675, Dec. 29, 1975, abandoned. This application Feb. 27, 1978, Ser. No. 881,481
Int. Cl.[2] C04B *7/42*
U.S. Cl. 106—100 **38 Claims**

1. In the wet process for the production of cement solids wherein limestone and clay are ground in the presence of water to form a pumpable kiln feed slurry, the improvement which comprises adding to said slurry an amount of a water-demand reducing system sufficient to synergistically reduce the water demand of said slurry, said system comprising (1) a water-soluble salt of a polyacrylic acid having a molecular weight of from about 2000 to about 50,000 and (2) a compound selected from the group consisting of alkali metal carbonates, bicarbonates, oxalates, silicates, aluminates and borates and ammonium carbonates, bicarbonates, oxalates and borates, (1) and (2) being employed in a ratio of from about 1:1 to about 1:80 by weight.

4,175,976
NON-DUSTING AGENT AND METHOD OF MANUFACTURE

Fitzhugh L. Avera, 1809 Yale Dr., Alameda, Calif. 94501

Continuation-in-part of Ser. No. 758,076, Jan. 10, 1977, Pat. No. 4,116,711, which is a continuation-in-part of Ser. No. 590,420, Jun. 26, 1975, abandoned. This application Apr. 10, 1978, Ser. No. 894,839
Int. Cl.[2] C09C *1/44, 1/58;* **C09D** *3/10*
U.S. Cl. 106—162 **9 Claims**

1. A flake-like, particulate mass consisting essentially of coherent, brittle flakes having a dry thickness in excess of about 25 microns, said coherent, brittle flakes consisting essentially of:

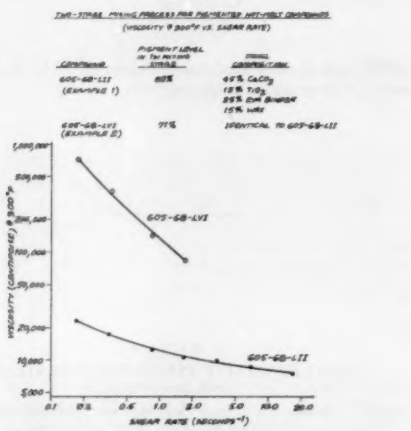
(a) about 2 to about 20 weight-% of a solid, non-toxic, biodegradable, water-soluble, essentially crystalline hexahydric alcohol matrix which is essentially free of chemically unassociated water, said hexahydric alcohol comprising a major amount of mannitol blended with sorbitol, and

(b) entrapped within and uniformly distributed through said matrix, about 80 to about 98 weight-% of solid particles having an average particle size less than 5% of the thickness of said flakes, said particles being insoluble in said matrix and being generally inert toward water and hexahydric alcohols and generally water-insoluble and having a melting point greater than 100° C.

4,175,977
PROCESS FOR PRODUCING A FLOWABLE, HIGHLY PIGMENTED, LOW VISCOSITY, HOT-MELT COATING COMPOUND

Michael J. Heaton, and James R. Quick, both of Warwick, N.Y., assignors to International Paper Company, New York, N.Y.

Filed Sep. 19, 1977, Ser. No. 834,089
Int. Cl.[2] C08J *3/22;* **C08L** *91/06*
U.S. Cl. 106—272 **6 Claims**



1. A process for preparing in two or more stages a flowable, nonaqueous, solvent-free, highly pigmented, low viscosity, thermoplastic, hot-melt coating compound, which comprises the steps of:

(a) mixing in an initial stage from about 70% to about 95%, by weight, of pigment with from about 5% to about 30%, by weight, of a low viscosity thermoplastic binder material selected from the group consisting of polyethylene, ethylene-vinyl acetate copolymers, ethylene-organic acid copolymers, ethylene-vinyl acetate-organic acid terpolymers, polypropylene, polystyrene, polyamides, paraffin wax, microcrystalline wax, polyterpene resins, and mixtures thereof, having a melt viscosity less than about 100,000 centipoises at a temperature in the range of from about 250° F. to about 300° F. and at a shear rate of from about 0.2 to about 2.0 reciprocal seconds for a period of time sufficient to obtain a homogeneous concentrate; and

(b) mixing in one or more subsequent stages the homogeneous concentrate of step (a) with sufficient additional amounts of low viscosity thermoplastic binder material selected from the group consisting of polyethylene, ethylene-vinyl acetate copolymers, ethylene-organic acid copolymers, ethylene-vinyl acetate-organic acid terpolymers, polypropylene, polystyrene, polyamides, paraffin wax, microcrystalline wax, polyterpene resins, and mixtures thereof, to yield a final homogeneous, flowable hot melt coating compound having a melt viscosity less than about 200,000 centipoises at a temperature in the range of about 250° F. to about 300° F. and at a shear rate of from about 0.2 to about 2.0 reciprocal seconds and comprising from about 30% to about 70%, by weight of pigment and from about 30% to about 70%, by weight, of low viscosity thermoplastic binder material.

4,175,978

ROAD PAVEMENT AND REPAIR

Alfred Marzocchi; Michael G. Roberts, and Charles E. Bolen, all of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Mar. 17, 1977, Ser. No. 778,415
Int. Cl.[2] C08L 95/00
U.S. Cl. 106—281 R 14 Claims

1. An upper surface wear course for a road pavement consisting essentially of (a) at least 90% by weight of a stone aggregate and (b) the balance of an organic matrix consisting essentially of (1) an asphalt and (2) flake glass particles, said flake glass particles being interspersed with the asphalt and uniformly distributed therein and the stone aggregate being dispersed in a continuous phase of the organic matrix.

4,175,979

PROCESS FOR THE MANUFACTURE OF A PIGMENT COMPOSITION IN BEAD FORM

George H. Robertson, Paisley, and John A. Stirling, Glasgow, both of Scotland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 602,339, Aug. 6, 1975, abandoned. This application Oct. 3, 1977, Ser. No. 838,592
Claims priority, application United Kingdom, Aug. 21, 1974, 36700/74
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.[2] C09C 3/00
U.S. Cl. 106—309 14 Claims

1. A process for the production of a pigment composition in bead form which comprises contacting with agitation, in the presence of from 0.2% to 5% by weight based on the amount of pigment plus carrier of an aqueous protective colloid, 1 part of a water insoluble carrier selected from the group consisting of fatty alcohols, fatty esters, amides of monocarboxylic fatty acids, phthalate esters, fatty oxazolines, water insoluble carboxylic acids, alkylimides, alkyl hydantoins, or mixtures of the aforementioned carriers and rosin acids or modified rosin acids, and water insoluble metal salts of said acids or a mixture of said acids with fatty primary amines, fatty secondary amines, or fatty imidazolines, said carrier melting below 100° C. and an aqueous dispersion of 0.25–2.3 parts of a pigment or water insoluble dyestuff, said process being conducted at a temperature above the melting point of the carrier and allowing the aqueous phase to become substantially free of pigment or water insoluble dyestuff by its association with the carrier and recovering the resulting pigmented beads, said pigmented beads having a particle size from 0.5 to 5 mm. diameter.

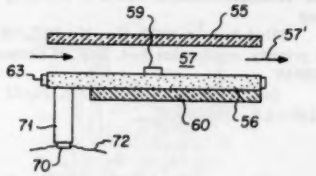
4,175,980

LUMINESCENT SOLAR COLLECTOR

Robert R. Davis, Arcadia, Calif.; Richard C. Sill, Reno, Nev., and John W. Yerkes, Granada Hills, Calif., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 18, 1978, Ser. No. 970,771
Int. Cl.[2] H01L 31/04
U.S. Cl. 136—89 FC 3 Claims

1. A luminescent solar collector comprising at least one luminescent member having at least one photovoltaic means operably associated therewith, said photovolatic means being physically removed from said luminescent member and optically coupled with said luminescent member by optic means, said luminescent member having at least one side which is adapted to be oriented toward the sun and an edge face, a light transparent member carried adjacent to and in spaced relation



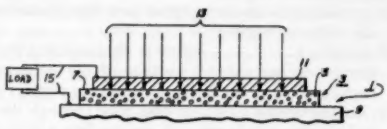
from said sun-side of said luminescent member, said transparent member being essentially coextensive with said luminescent member.

4,175,981

PHOTOVOLTAIC CELL COMPRISING METAL-FREE PHTHALOCYANINE

Rafik O. Loutfy; Lloyd F. McIntyre, both of Mississauga, and James H. Sharp, Oakville, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 3, 1978, Ser. No. 921,302
Int. Cl.[2] H01L 31/06
U.S. Cl. 136—89 SJ 30 Claims



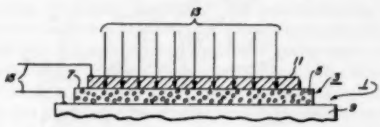
1. A photovoltaic apparatus comprising a device having a first, ohmic electrode and a second, barrier electrode having sandwiched therebetween a photoactive layer comprising metal-free phthalocyanine dispersed in an electrically insulating binder and leads connecting each of said electrodes to an electrical circuit forming a load circuit wherein said device is the power source.

4,175,982

PHOTOVOLTAIC CELL

Rafik O. Loutfy, Mississauga; Cheng-Kuo Hsiao, Toronto, and James H. Sharp, Oakville, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 3, 1978, Ser. No. 921,289
Int. Cl.[2] H01L 31/04
U.S. Cl. 136—89 SJ 25 Claims



1. A photovoltaic device comprising a first, ohmic electrode and a second, barrier electrode and sandwiched therebetween a photoactive layer comprising metal-free phthalocyanine dispersed in an electrically insulating binder wherein the barrier electrode comprises a metal the oxide of which is electrically conductive.

2. The device of claim 1 wherein the barrier electrode is selected from the group consisting of indium and tin.

4,175,983

PROCESS FOR THE PRODUCTION OF A HIGH FREQUENCY TRANSISTOR

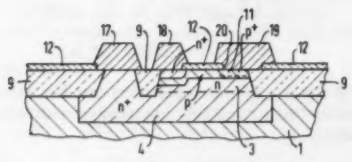
Ulrich Schwabe, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 14, 1978, Ser. No. 915,368

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1977, 2728845

Int. Cl.[2] H01L *21/22, 21/26, 29/72*

U.S. Cl. 148—1.5 **6 Claims**



1. A method for the production of a high frequency transistor formed in insulated fashion within a semiconductor body of an integrated circuit, comprising the steps of:

(a) providing a semiconductor substrate of first conductivity type;

(b) diffusing a collector region of second conductivity type in the substrate and exposed at a surface of the substrate;

(c) providing an insulating region in the collector region;

(d) diffusing a base contact zone of first conductivity type in the collector region;

(e) providing an insulating layer over the exposed surface of the collector region;

(f) opening an emitter window in the insulating layer over a portion of the exposed surface of the collector region between the insulating region and base contact zone;

(g) ion implanting an active base zone through the window and simultaneously through the insulating layer to create a connecting zone between the active base zone and the base contact zone; and

(h) diffusing an emitter zone of second conductivity type in the active base zone.

4,175,984

METHOD AND A DEVICE FOR INITIATING AN OXYGEN DESEAMING PROCESS

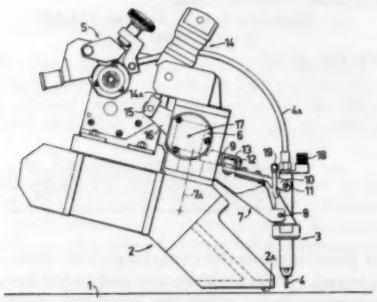
Bengt A. Johansson, Göthenburg, Sweden, assignor to Centro-Maskin Goteborg AB, Gothenburg, Sweden

Filed May 10, 1978, Ser. No. 904,411

Claims priority, application Sweden, May 12, 1977, 7705545

Int. Cl.[2] B23K *7/08*

U.S. Cl. 148—9.5 **6 Claims**



1. A method for initiating a gas deseaming process on a workpiece by melting of the surface of the workpiece to ignition temperature by means of a point heat source, characterized in that the point heat source is given a motion parallel to the orifice of the planing nozzle in direct connection to this, oxidizing gas simultaneously flowing through the planing nozzle.

4,175,985

METHOD OF PRODUCING STEEL SECTIONS OF IMPROVED QUALITY

Emile Blondelot, Esch-sur-Alzette, Luxembourg; Marios Economopoulos, Liege, and Stephan H. Wilmotte, Chaudfontaine, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Belgium and ARBED Acieries Reunies de Burbach-Eich-Dudelange S.A., Luxembourg

Filed May 11, 1978, Ser. No. 904,901

Claims priority, application Belgium, May 13, 1977, 854647

Int. Cl.[2] C21D *1/18, 1/20*

U.S. Cl. 148—12.4 **6 Claims**

1. A method of improving the quality of a steel section having a thickness of 6 to 40 mm, emerging from a hot rolling mill at a temperature of 1000° to 800° C., the method comprising subjecting the section to surface quenching for 2 to 6 seconds, wherein the cooling rate during the surface quenching is of the order of 1.5 to 5 MW/m^2, and the equalization temperature of the section due to subsequent self-tempering is 500° to 700° C.

4,175,986

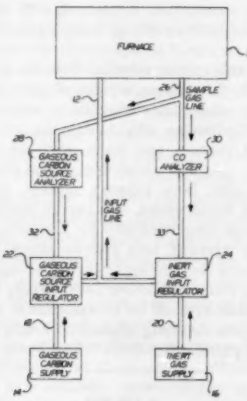
INERT CARRIER GAS HEAT TREATING CONTROL PROCESS

Leonard J. Ewalt, Lafayette, Ind., and Som N. Kaushal, Lebanon, Tenn., assignors to TRW Inc., Cleveland, Ohio

Filed Oct. 19, 1978, Ser. No. 952,657

Int. Cl.[2] C21D *1/48*

U.S. Cl. 148—16.5 **25 Claims**



1. A method of heat treating ferrous articles comprising

introducing a gaseous carbon source and an inert carrier gas into a heat treating furnace containing ferrous articles being heat treated in a furnace atmosphere containing carbon monoxide,

determining the amount of carbon monoxide in the furnace atmosphere, and

controlling the flow of inert carrier gas into the furnace to maintain the amount of carbon monoxide in the furnace atmosphere below about 3% by volume to control the carbon potential to a desired level by minimizing the effect of equilibrium reactions.

4,175,987
LOW ALLOY TEMPERED MARTENSITIC STEEL

Patrick W. Rice, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Continuation of Ser. No. 821,645, Aug. 4, 1977, abandoned. This application Jul. 28, 1978, Ser. No. 928,855
Int. Cl.² C22C *38/22*
U.S. Cl. 148—36 **9 Claims**

1. An improved hydrogen sulfide service, cryogenic steel consisting of:

Element	Percent by Weight
Carbon	0.22–0.30
Manganese	0.85–1.30
Phosphorous	0.035 max.
Sulphur	0.035 max.
Silicon	0.65 max.
Chromium	0.77–1.13
Molybdenum	0.33–0.47

Balance Iron and not more than approximately 1% incidental steel-making residual elements, said steel having been heat treated and water quenched (H=at least approximately 1.5) to develop a 50% tempered martensite micro-structure at the center of the thickest section thereof.

4,175,988
MELT-FORMED POLYCRYSTALLINE CERAMICS AND DOPANT HOSTS CONTAINING PHOSPHORUS

James E. Rapp, Oregon, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 887,264, Mar. 16, 1978, Pat. No. 4,141,738. This application Aug. 14, 1978, Ser. No. 933,294
Int. Cl.² H01L *21/223*
U.S. Cl. 148—189 **9 Claims**

1. In a process of doping a semiconductor wherein a semiconductor and a planar dopant host for vapor phase transport of P_2O_5 are maintained in vapor phase communication at a temperature and for a time sufficient to form a zone of N-type conductivity in said semiconductor, the improvement comprising using a dopant host which is a melt-formed polycrystalline ceramic body having an average linear coefficient of thermal expansion of less than 32×10^{-7}/°C. over the range from zero to 300° C. and less than 42×10^{-7}/°C. over the range from zero to 700° C., said ceramic body having a composition consisting essentially of

Oxide	Mole Percent
P_2O_5	45–75
Al_2O_3	11–28
Ta_2O_5	6.5–13
SiO_2	0–20
La_2O_3	0–7

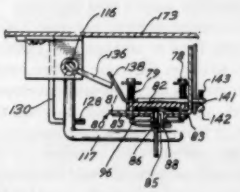
where $P_2O_5+Al_2O_3+Ta_2O_5$ is at least 75 mole percent of the composition and the mole ratio P_2O_5/Al_2O_3 is at least 2.

4,175,989
NEWSPAPER VENDING MACHINE

Albert R. Pospischil, South Beloit, Ill.; Michael L. Bruegman, and Erlang W. Granberg, both of Beloit, Wis., assignors to Precision Fabricators, Inc., South Beloit, Ill.

Filed Mar. 27, 1978, Ser. No. 890,183
Int. Cl.² G07F *1/04*
U.S. Cl. 194—1 C **7 Claims**

1. A coin receiver for use with a newspaper or the like vending machine having dispensing means therein, comprising first and second frame members defining a chute for receiving coinage, said frame members being biased toward one another and being actuable away from one another to release coinage from the chute, lever means for extending into the chute to set the chute for receiving predetermined coinage, a receptacle for storing coinage, first actuating means operatively connected to one of said frame members for moving said frame member relative to the other frame member in response to actuation of the dispensing means to discharge the coinage into said recep-



tacle, and second actuating means operatively connected to said one frame member for moving the said one frame member further relative to said other frame member.

4,175,990
WATER-GEL EXPLOSIVE AND A METHOD OF PRODUCING THE SAME

Katsuhide Hattori, and Masao Takahashi, both of Aichi, Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

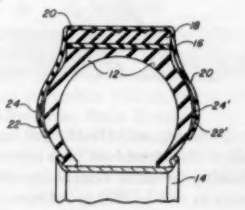
Filed Jun. 19, 1978, Ser. No. 916,724
Claims priority, application Japan, Jun. 27, 1977, 52/75485
Int. Cl.² C06B *45/02*
U.S. Cl. 149—21 **21 Claims**

1. A water-gel explosive comprising (a) ammonium nitrate alone or in admixture with other inorganic oxidized acid salt, (b) water, (c) nitroparaffin having 1 to 3 carbon atoms, (d) a gelatinizing agent for water, (e) a gelatinizing agent for nitroparaffin, (f) glass hollow microspheres and (g) an amide.

4,175,991
TIRE RETREADING METHOD

Albert A. Harrelson, Jr., Asheboro, N.C., assignor to Harrelson Rubber Company, Asheboro, N.C.

Filed Nov. 14, 1977, Ser. No. 851,205
Int. Cl.² B29H *17/36*
U.S. Cl. 156—96 **10 Claims**



1. In. a tire retreading method of the type including the formation of an assembly comprised of a tire, a layer of cushion gum binder material and an overlying replacement tread strip encircling the circumferential surface of said tire, and a flexible envelope having a central portion overlying said replacement tread strip and marginal edge portions overlying the sidewalls of the tire; said tread strip being adapted to be permanently bonded to said tire by treatment of said assembly within a chamber having means associated therewith for elevating the temperature and pressure therewithin, and for evacuating fluid from beneath said envelope; the improvement comprising:

providing said assembly, prior to its treatment within said chamber, with first and second annular bands of cushion gum binder material respectively extending between said envelope marginal edge portions and said tire sidewalls overlaid thereby; said bands of cushion gum binder mate-

rial being ineffective, prior to treatment of said assembly within said chamber, to establish fluid-type sealed relationships between said envelope marginal edge portions and said tire sidewalls;

placing the assembly within said chamber;

increasing the temperature and pressure within said chamber to cause plastic flow of said bands of cushion gum material and thereby to cause the same to then establish fluid-tight sealed relationships between said envelope marginal edge portions and said tire sidewalls overlaid thereby;

evacuating fluid from beneath said envelope following the establishment within said chamber of said fluid-tight sealed relationships between said envelope marginal edge portions and said tire sidewalls overlaid thereby;

maintaining said assembly at an elevated temperature and pressure within said chamber for a period of time sufficient to cause permanent bonding of said tread strip to said tire, and then terminating the chamber treatment of the assembly;

and removing said envelope and said bands from said assembly following termination of said chamber treatment thereof.

4,175,992

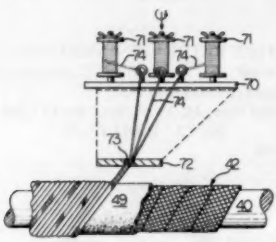
METHOD OF MAKING HIGH PRESSURE REINFORCED HYDRAULIC HOSE

Charles E. Grawey, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 673,187, Apr. 2, 1976, abandoned. This application Mar. 23, 1978, Ser. No. 889,832

Int. Cl.[2] B65H *81/00*

U.S. Cl. 156—143 **9 Claims**



1. A method of forming cable reinforced hose comprising:

forming a hollow elastomer core on a mandrel;

winding a plurality of cable reinforcing elements on said elastomer core in side-by-side spiral convolutions to form a first cylindrical reinforcing ply, each of said cable elements being composed of multiple strands of wire, each strand being separately tensioned as it is twisted with other strands and wound on the core structure, thereby forming a cable in situ;

winding a plurality of cable elements on said first cylindrical reinforcing ply in side-by-side spiral convolutions to form a second cylindrical reinforcing ply, said spiral convolutions of said second reinforcing ply angularly crossing those of said first reinforcing ply, each of said cable elements in said second reinforcing ply being composed of multiple strands of wire, each strand being separately tensioned as it is twisted with other strands and wound, thereby forming a cable in situ;

encircling the built-up cable reinforced hose structure with jacket elastomer to form its outer covering; and

subsequently vulcanizing said core, said reinforcing elements and said jacket elastomer into an integral unit to form cable reinforced hose.

4,175,993

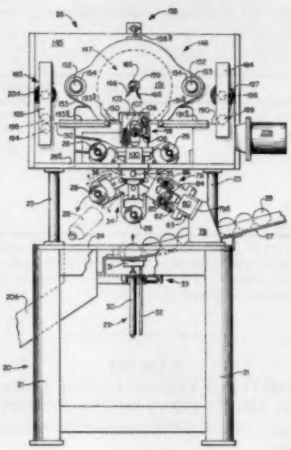
ARTICLE DECORATING MACHINE AND METHOD

Elmer L. Robertson, Overland Park, Kans., assignor to Ethyl Development Corporation, Baton Rouge, La.

Filed Nov. 9, 1977, Ser. No. 849,803

Int. Cl.[2] B65C *3/12*

U.S. Cl. 156—234 **16 Claims**



1. A method for applying indicia to the surface of a generally cylindrical article comprising:

(a) vertically elevating said article horizontally positioned and gripping the sidewall surface of said article at an article-loading station by gripping means carried by a rotating article transport assembly;

(b) rotating said article transport assembly about a horizontal axis to bring said article to a fixedly positioned, combined orienting and indicia transfer station;

(c) supporting said article for rotation about its longitudinal axis at said combined orienting and indicia transfer station;

(d) releasing said article from the grip of said gripping means;

(e) orienting said article to properly position the selected portion of the sidewall surface thereof for receiving the indicia by rotating said article with means fixedly positioned at said orienting and indicia transfer station;

(f) drivingly rotating said article on its axis while pressing a moving strip of indicia printing material between said selected portion of said bottle sidewall surface while contacting the other side of said strip with a hot die carrying the indicia to be printed on said article;

(g) stopping said rotation of the article after indicia transfer is completed and gripping the sidewall surface of said article by said gripping means;

(h) rotating said article transport assembly to bring said article to an eject station; and

(i) opening said gripping means to release said article.

2. An apparatus for applying indicia to generally cylindrical articles comprising:

(a) article elevating means adapted to receive a horizontally positioned single article and to elevate said article in a direct vertical path to an article-receiving station;

(b) turret means mounted for rotation about a horizontal axis, said turret means having a plurality of radially extending, article-gripping means mounted thereon for gripping the sidewalls of a plurality of said articles;

(c) means for rotating said turret in incremental steps including rotating coupling means for directly applying power to said turret;

(d) means independent of said turret means for rotatively holding and orienting an article at an indicia-applying station;

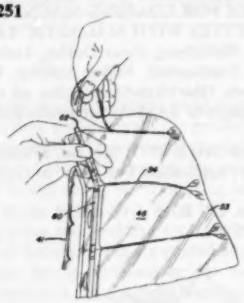
(e) means for applying indicia to an article at said indicia-applying station after said article is oriented;
(f) means to simultaneously
(i) open said gripping means to receive an article at said article-receiving station,
(ii) release a gripped article after it is received by said holding and orienting means at said indicia-applying station, and
(iii) release a gripped article at a discharge station; and
(g) means to simultaneously close said gripping means at said article-receiving station and at said indicia-applying station to hold said articles securely while said articles are transported from said receiving station to said indicia-applying station and from said indicia-applying station to said discharge station.

4,175,994

METHOD OF MANUFACTURING A FLEXIBLE COLLAPSIBLE CONTAINER WITH A STIFFENING MEMBER

William W. Norton, Deerfield, and Henry Boehmer, Mt. Prospect, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 17, 1977, Ser. No. 852,422
Int. Cl.[2] B32B *31/18, 31/20;* **B65D** *35/14*
U.S. Cl. 156—251 **6 Claims**



1. The method of forming flexible, collapsible containers from a pair of facing sheet sections and a stiffener bar positioned between said sheet sections, which comprises:

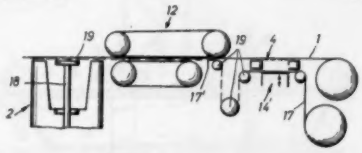
passing said pair of facing sheet sections along a process path through a sealing die, with a continuous length of said stiffener bar being positioned between said sheet sections and passed along said process path with said sheet sections; forming seal lines with said sealing die between said facing sheet sections to define a group of said collapsible containers, each carrying said stiffener bar in transverse relation thereto; cutting through at least one of said sheet sections and incompletely cutting said stiffener bar at positions adjacent the edges of said collapsible containers; cutting said one sheet section and stiffener bar at a position within each edge of each collapsible container; and removing the cut-away edge portions of said stiffener bar, to facilitate the separation of the formed, collapsible containers, carrying separated stiffener bar sections, from each other whereby each remaining stiffener bar section is of less width than each collapsible container in its as-made configuration.

4,175,995

PROCESS OF PRODUCING A DEEP-DRAWN CONTAINER

Kurt Walter, Glauburg, Fed. Rep. of Germany, assignor to Hassia Verpackung GmbH, Ranstadt, Fed. Rep. of Germany

Filed Sep. 9, 1977, Ser. No. 831,846
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1976, 2642366
Int. Cl.[2] B29C *17/03*
U.S. Cl. 156—285 **8 Claims**



1. A process for the production of deep-drawn containers in the form of cups, pans or the like which containers are adapted to be covered with a material such as a metal foil after filling, said process comprising the steps of:

(a) positioning a banderole in a deep-drawing mold on the side wall thereof;
(b) positioning a bottom blank in the deep-drawing mold on the bottom wall thereof in such a manner as to permit suction from said mold between said banderole and bottom blank;
(c) feeding a length of thermo-deformable material to the deep-drawing mold;
(d) deep-drawing the thermo-deformable material;
(e) locating the lower edge of the banderole so that it will be in overlapping relationship with the peripheral edge of the bottom blank after the container is formed and,
(f) securing the banderole and the bottom blank to the external side and bottom wall surface of the deep-drawn, thermo-deformable material.

4,175,996

GLUE FOR ARTICLES IN THE TOBACCO INDUSTRY AND METHOD EMPLOYING SAME

Jean-Claude Battard, Saran, and Jean Buisson, Orleans, both of France, assignors to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France

Division of Ser. No. 872,471, Jan. 26, 1978, which is a continuation of Ser. No. 685,750, May 13, 1976, abandoned. This application Mar. 2, 1978, Ser. No. 882,764
Int. Cl.[2] C09J *3/02*
U.S. Cl. 156—336 **4 Claims**

1. A method of glueing articles of the tobacco industry comprising:

preparing a glue characterized by the fact that at ambient temperature it is in gel form composed mainly of water and gelatine, the gelatine concentration being in the 25–180% range in relation to the water weight, and a minor quantity of plasticizer for the gelatine in aqueous solution, belonging to the food polymers group comprising natural and modified vegetable gums and cellulose ethers, the plasticizer's concentration being within the 0.25–8% range in relation to the weight of the gelatine alone, and being adjusted so that the temperature at which the liquified gel viscosity remains superior to 50 centipoises and becomes lower than 1000 centipoises is within the 40°–70° C. range;

glueing an article of the tobacco industry with said glue; and drying said glue.

4,175,997

APPARATUS FOR THE APPLICATION OF INDIVIDUAL PATTERN ELEMENTS IN SERIES TO A WEB-LIKE FLAT STRUCTURE

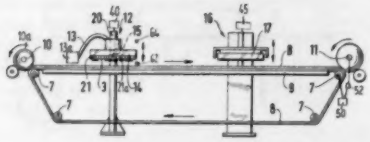
Hermann Müller, Herisau, Switzerland, assignor to Aktiengesellschaft Cilander, Herisau, Switzerland

Filed Jan. 30, 1978, Ser. No. 873,671

Claims priority, application Sweden, Feb. 10, 1977, 771650

Int. Cl.² B65C *9/08*

U.S. Cl. 156—362 **13 Claims**



1. An apparatus for the series patterning of a spread, web-like flat structure by means of individual pattern elements which can be bonded thereto by applying pressure heat, or both, comprising:

a plurality of work stations;

a transport device for the step-wise transport of the flat structure to which the pattern is to be applied past said plurality of work stations;

at least one stack of pattern elements;

support means for supporting said stack of pattern elements;

at least one device for lifting at least one pattern element from said stack arranged upon said support means, for transporting the lifted pattern element over the flat structure and for depositing such thereon at a first one of said work stations;

means for bonding the deposited pattern element at the flat structure;

said bonding means being arranged at a work station located after said first work station with respect to the direction of transport of the flat structure;

control means for controlling the step-wise transport of the flat structure past the work stations and the working operations of both said lifting device and bonding means, such that when the flat structure is at standstill there are deposited thereon pattern elements, and at the same time pattern elements which have been previously deposited are bonded with said flat structure;

said lifting device comprises at least one suction device having a plurality of suction elements;

a pipe system for operatively connecting said plurality of suction elements with one another;

means for defining a source of negative pressure operatively connected with said suction elements by means of said pipe system;

adjustable stop means cooperating with said support means for locating said pattern element stack in a predetermined position in staggered relationship to the pipe system;

said pipe system being arranged with respect to the adjustable stop means such that, with the suction device lowered onto the support means, said stop means are not contacted by said suction elements or the pipes of the pipe system.

4,175,998

FOAM WELDING APPARATUS

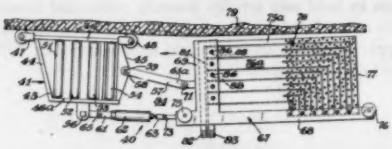
Robert A. Hay, II, Midland, and John S. Boruszewski, Saginaw, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 17, 1978, Ser. No. 925,586

Int. Cl.² H05B *3/20;* B29C *27/22;* B32B *31/04;* B65H *81/04*

U.S. Cl. 156—391 **6 Claims**

1. In an insulation applying apparatus comprising in cooperative combination a first support means, a means to propel the first support means about the periphery of an object to be insulated, an insulation depositing means supported by the first support means and selectively moveable relative to the first support means, the depositing means adapted to trace a generally spiral path over at least a portion of an object to be insulated, means to heat surfaces of adjacent thermoplastic foam strips to a temperature sufficient to fuse the thermoplastic foam strips together, the improvement which comprises the means to heat surfaces is a generally planar heating element of sufficient size to engage surfaces of adjacent thermoplastic foam strips, the heating element having a first generally unheated



leading end, a second or heatable trailing end, the heat element having a first or tank side and a second or exterior side, the heating element defining a plurality of generally L-shaped interdigitated slots, the slots being generally parallel to the ends and sides of the heating element, the heating element defining an electrical serpentine path, the heating element being of electrically conductive material and defining a region of greater electrical resistance adjacent the trailing end and means to maintain the heating element in generally fixed lateral relationship relative to the foam strips being welded.

4,175,999

APPARATUS FOR LOADING MAGNETIC TAPE CASSETTES WITH MAGNETIC TAPE

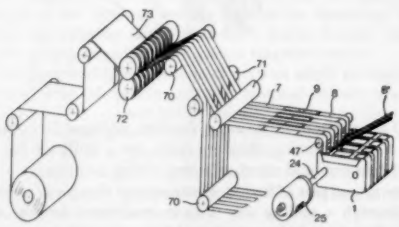
Klaus Schoettle, Heidelberg; Peter Dobler, Ludwigshafen; Lothar Gliniorz, Frankenthal; Volker Scherer, Willstaett, and Heinz Brombach, Oberkirch-Stadelhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 5, 1977, Ser. No. 839,660

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1976, 2650457

Int. Cl.² B31F *5/06;* B65H *69/06*

U.S. Cl. 156—505 **4 Claims**



1. Apparatus for the simultaneous loading with magnetic tape of a plurality of otherwise finished magnetic tape cassettes provided with leader tape, comprising:

(a) a device for cutting a web of base film provided with a magnetic coating longitudinally into a plurality of magnetic tapes;

(b) means for guiding each of said tapes from said web cutting device downstream to the remainder of said apparatus;

(c) a holder for magnetic tape cassettes to be arranged one next to another;

(d) a drive with a splined shaft which can be inserted into the hubs of said magnetic tape cassettes and withdrawn therefrom;

(e) means for simultaneously transversely severing each of said magnetic tapes and simultaneously dispensing and pressing strips of splicing tape onto the ends of said magnetic tapes produced by said severing, which severing and splicing tape dispensing and pressing means are located on a frame and can be moved at right angles to the surfaces of said magnetic tapes; and

(f) a splicing station for simultaneously joining said severed magnetic tape ends provided with splicing tape to corresponding leaders of said magnetic tape cassettes, which station is associated with said severing and splicing tape dispensing and pressing means and is arranged between said holder and said guide means.

4,176,000

APPARATUS FOR MAKING CHAINS OF SACKS

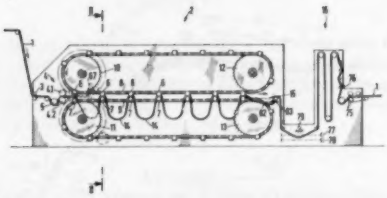
Fritz Achelpohl, and Horst Schneider, both of Lengerich of Westphalia, Fed. Rep. of Germany, assignors to Windmoller & Holscher, Lengerich of Westphalia, Fed. Rep. of Germany

Filed Dec. 14, 1977, Ser. No. 860,635

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1976, 2659202

Int. Cl.[2] B32B *31/00*; B30B *15/34*

U.S. Cl. 156—510 **32 Claims**



1. Apparatus for applying transfer weld seams to superposed webs of plastics film, preferably for the production of chains of sacks from semi-tubular plastics webs, comprising:

a plurality of welding tools arranged in pairs;

welding tool holder means for supporting each pair of welding tools;

means for guiding said welding tool holder means so that said pairs of welding tools are guided along a planar processing path that is traversed by the webs, enclose the webs between each other, extend transversely of the webs, and act on each other to weld the webs, said means for guiding including pairs of upper and lower endless chains disposed on both sides of the webs, said welding tool holder means including pairs of upper and lower members carrying said welding tools, one of each of said pairs of upper and lower members being connected to and driven by its respective chains, the other of said pairs of upper and lower members being connected to its respective chains in such manner that said other members can be uncoupled and moved with respect to its chains into a position wherein said other member, while being connected to its chains, is coupled to and driven by the other chains.

4,176,001

STOCKING MENDING APPARATUS

Bernard B. Bringman, and Genevieve M. Goodwin, both of 1111 N. 8th St., Boise, Id. 83702

Filed Sep. 11, 1978, Ser. No. 940,983

Int. Cl.[2] B32B *31/00*; B30B *15/34*

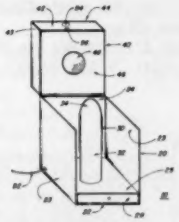
U.S. Cl. 156—581 **10 Claims**

1. Stocking mending apparatus comprising

a base including an enclosure;

a vertically upstanding stocking form, having a substantially ovoid head portion, supported on said enclosure;

a housing cover engageable with said base, said cover including on its under surface a recessed heat conducting



cap operable to matingly receive the head portion of said stocking form; and means for heating said cap.

4,176,002

CONTROLLING THE MELT TEMPERATURE DURING ZONE REFINING AND CZOCHRALSKI CRYSTAL GROWTH BY SENSING THE VISCOUS TORQUE OF THE MELT ZONE DURING OPERATION

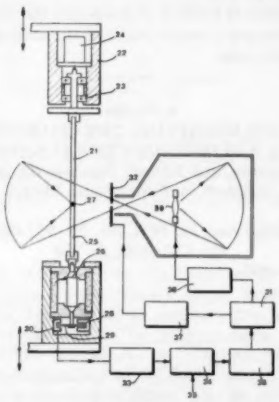
Jean-Michel Quenisset; Rober Naslain, and Paul Hagenmuller, all of Talence, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Continuation of Ser. No. 605,343, Aug. 18, 1975, abandoned. This application Apr. 6, 1977, Ser. No. 785,184

Claims priority, application France, Aug. 21, 1974, 74 28762

Int. Cl.[2] B01J *17/10, 17/18*

U.S. Cl. 156—601 **12 Claims**

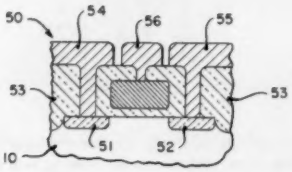


1. In the production of an ingot of fusible inorganic material by the moving melting zone method wherein a viscous molten zone is formed in a vertical ingot of said material and said zone is moved along said ingot thereby concentrating in said zone the impurities in said ingot, and the viscosity of the melt in said zone fluctuates as said zone is moved along said bar, the improvement which comprises: applying torque to one of the ends of said ingot thereby rotating said end about its axis at constant speed, continuously detecting variations in the viscous torque due to the viscous friction generated in said molten zone during the operational period of the heating cycle during which the molten zone is moved along the ingot, and increasing the temperature of said molten zone when said viscous torque increases and decreasing the temperature of said molten zone as said viscous torque decreases, thereby maintaining substantially constant (a) the torque on said end of said ingot and (b) the viscosity of said molten zone, and thereby producing a purified ingot of substantially uniform diameter.

4,176,003
METHOD FOR ENHANCING THE ADHESION OF PHOTORESIST TO POLYSILICON

Ronald W. Brower, Dayton; Jerome Cohen, Centerville, both of Ohio, and Peter C. Chen, Sunnyvale, Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 22, 1978, Ser. No. 879,933
Int. Cl.[2] H01L *21/306, 21/312, 21/316*
U.S. Cl. 430—313 **6 Claims**



4. A process for etching a polysilicon surface comprising:

subjecting the surface in a vacuum chamber to an oxide plasma provided by rf power of about 90 milliwatts per chamber cubic centimeter operating on oxygen flowing in an ambient pressure of about 0.5–2.0 torr to form a monolayer of silicon oxide on the surface;

forming an organic photoresist to a predetermined masking pattern on the polysilicon surface; and

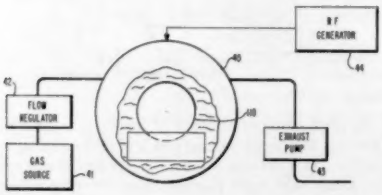
etching the polysilicon surface in a vacuum chamber in the presence of the photoresist mask by exposing the masked polysilicon surface to a freon plasma generated by rf power of about 20 milliwatts per chamber cubic centimeter operating on freon flowing in an ambient pressure of about 1.5–2.5 torr.

5. The process of claim **1** or **4** wherein the oxygen plasma oxidation technique is employed after the etching step to remove the photoresist.

4,176,004
METHOD FOR MODIFYING THE CHARACTERISTICS OF A SEMICONDUCTOR FUSIONS

Joseph E. Johnson, and Edward Dombrowski, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 21, 1978, Ser. No. 935,429
Int. Cl.[2] H01L *21/306*
U.S. Cl. 156—643 **8 Claims**



1. A method for etching a thyristor fusion to lower the firing current to a desired value, consisting of the steps of:

(a) disposing at least one thyristor fusion in a plasma etching chamber, said fusion comprising a body of semiconductor material including an anode emitter region therein and an anode electrode affixed thereto, an anode base region, a cathode base region and a gate electrode affixed thereto with portions of said body of semiconductor material exposed in an area adjacent to said gate electrode and a cathode emitter region having a cathode electrode affixed thereto, each of at least one thyristor fusion having a firing current in excess of a desired predetermined value;

(b) establishing a predetermined flow rate of a selected gas mixture through said plasma etching chamber;

(c) establishing an RF field in said etching chamber whereby said selected gas ionizes to produce ions which react with said exposed portions of said body of semiconductor material to produce gaseous etching by-products;

(d) thereby etching said exposed portions of said body of semiconductor material;

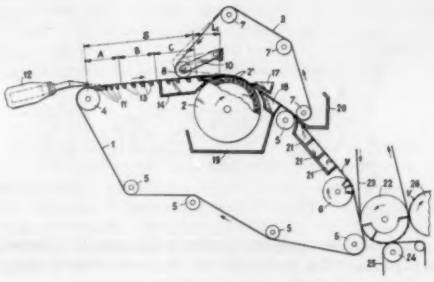
(e) continuing said etching for a predetermined time interval; and

(f) removing said at least one fusion from said plasma etching chamber and measuring the firing current of said at least one fusion.

4,176,005
DOUBLE FILTER PAPERMAKING MACHINE

Alfred Bubik, Ravensburg, and Siegfried Reutter, Gerbertshaus, both of Fed. Rep. of Germany, assignors to Escher Wyss GmbH, Ravensburg, Fed. Rep. of Germany

Filed Dec. 26, 1978, Ser. No. 973,071
Claims priority, application Switzerland, Jan. 16, 1978, 406/78
Int. Cl.[2] D21F *1/24, 9/02*
U.S. Cl. 162—256 **12 Claims**



1. A double filter papermaking machine comprising:

two endless movable filters defining a first filter and a second filter;

a dewatering cylinder positioned below and cooperating with said two endless filters;

said two endless filters serving to guide a paper web located therebetween along part of the surface of the dewatering cylinder;

said first filter defining an inner filter located closer to said dewatering cylinder than said second filter;

said first filter having a linear section disposed forwardly of the filter and deviating from the horizontal direction by at most 45°;

headbox means cooperating with the first filter for the infeed of a stock suspension for forming the paper web;

a slide shoe having a curved surface;

said slide shoe being arranged between said linear section and said dewatering cylinder;

said curved surface of said guide shoe being curved in the same direction as said dewatering cylinder and having a radius which is larger than the radius of the dewatering cylinder;

said second filter defining an outer filter located further from said dewatering cylinder than said first filter;

an adjustable guide roll cooperating with said second filter;

means for adjusting the position of said guide roll;

said guide roll, depending upon its position, enabling displacement of a contact line defining the location where the outer filter contacts the inner filter;

said slide shoe being arranged directly forwardly of said dewatering cylinder; and

said adjustable guide roll enabling an adjustment of the contact line between a starting region of the slide shoe and

a location at the dewatering cylinder disposed externally of the slide shoe.

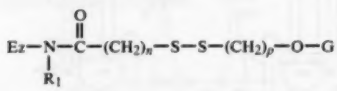
4,176,006

ENZYME IMMOBILIZATION WITH A DISULPHIDE BRIDGE

Richard A. Cormier, St. Hubert, and Claude F. Gagnon, Repentigny, both of Canada, assignors to Redpath Sugars Limited, Montreal, Canada

Filed Jan. 13, 1978, Ser. No. 869,239
Int. Cl.[2] C12D *13/00*; C07G *7/02*
U.S. Cl. 435—74 **18 Claims**

1. An insolubilized, enzymatically active substance comprising an enzyme linked by a disulphide group containing covalent bridge to a support carrier, and having the formula (V)



(V)

in which

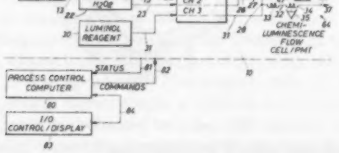
is the residue of an enzyme having lost a hydrogen atom from an amino group, n and p, which may be the same or different, are integers of 1 to 6; and G represents a support carrier comprising glass beads having a specific pore size of 200Å to 1000Å and a surface area of 5 to 10 sq. m/g.

4,176,007

METHOD AND APPARATUS FOR ELIMINATING LUMINOL INTERFERENCE MATERIAL

Robert A. Frosch, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Eldon L. Jeffers, LaPorte, Tex. and Richard R. Thomas, Mountain View, Calif.

Filed Feb. 9, 1978, Ser. No. 876,440
Int. Cl.[2] C12K *1/04, 1/10*
U.S. Cl. 435—34 **18 Claims**



1. A method of eliminating interfering luminescence produced by agents unrelated to the concentration of bacteria contained in a selected fluid during a chemiluminescent assay thereof, comprising the steps of

drawing a preselected quantity of the selected fluid,

reacting said preselected quantity of the selected fluid with a first reagent for a predetermined time period to reduce luminescence producing organic agents contained in the selected fluid below a selected level, said first reagent being a hydrogen peroxide solution having a preselected concentration and said predetermined time period is determined by the concentration of said hydrogen peroxide solution,

thereafter reacting said first reagent and selected fluid combination with a second reagent for releasing predetermined components of the bacteria cells containing in the selected fluid and reacting with said released components and with inorganic agents contained in the selected fluid to cause luminescence representative of the concentrations of bacteria and said inorganic agents contained in said selected fluid, said second reagent including sodium hydroxide for rupturing all bacteria cells to release iron porphyrins contained therein, and a luminol/hydrogen peroxide mixture for producing said luminescence upon reaction with said iron porphyrins,

allowing said reaction fluid to luminesce for a preselected period of time for maximizing the decay of said luminescence produced by said inorganic agents,

thereafter measuring the level of luminescence remaining in said reaction fluid, and

visually displaying said luminescence measurement as an indication of the concentration of the bacteria contained in the selected fluid.

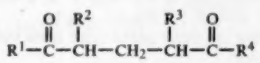
4,176,008

METHOD, COMPOSITION AND ELEMENT FOR THE DETECTION OF NITROGEN-CONTAINING COMPOUNDS

John Figueras; Roger W. Nelson, and Richard C. Sutton, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 24, 1978, Ser. No. 880,828
Int. Cl.[2] G01N *33/16*
U.S. Cl. 435—12 **25 Claims**

1. An element for the determination in an aqueous sample of nitrogen-containing analyte capable of releasing ammonia upon enzymatic action, said element comprising a spreading layer and a reagent layer in fluid contact and containing (a) at least one enzyme which catalyzes the decomposition of the analyte to ammonia, and (b) a diketone of the formula



wherein R^1, R^2, R^3 and R^4 are the same or different, and are each hydrogen, aryl of from 6 to 20 carbon atoms, a straight- or branched-chain alkyl or aralkyl of up to about 20 carbon atoms, or a cycloalkyl of from about 5 to about 7 carbon atoms.

4,176,009

METHOD OF MEASURING COLLAGENASE ACTIVITY

Shumpei Sakakibara, Suita; Yutaka Nagai, Koshigaya; Kenji Fujiwara, and Takahiro Sakai, both of Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Division of Ser. No. 761,020, Jan. 21, 1977, Pat. No. 4,138,394. This application Nov. 21, 1977, Ser. No. 853,302
Claims priority, application Japan, Jan. 24, 1976, 51/6926; Aug. 30, 1976, 51/103505; Aug. 30, 1976, 51/103506
Int. Cl.[2] G01N *31/14*
U.S. Cl. 435—24 **9 Claims**

1. A method of measuring collagenase activity which comprises contacting a compound having the structure

A-Pro-B-Gly-C-Ala-Gly-E

with collagenase in an aqueous medium whereby said compound is hydrolyzed to release peptide fragments, extracting the released peptide fragments containing A with an organic solvent, and assaying the extract by subjecting the extract to colorimetry, said A being a hydrophobic, and neutral or acidic chromophore selected from the group consisting of 2,4-dinitrophenyl, 5-dimethyl-amino-1-naphthalene-sulfonyl, p-phenylazobenzyloxycarbonyl, p-nitrobenzyloxycarbonyl, p-(4-hydroxy-1-naphthylazo)-benzenesulfonyl and p-phenylazobenzoyl, said B being an amino acid residue of an alpha-amino

acid having up to 15 carbon atoms occurring in protein, said C being Ile or Leu, said E being Gln-D-Arg-OH or D-Arg-OH, and all the amino acid residues except for Gly being L-configuration unless otherwise stated.

4,176,010

METHOD OF PRODUCING PETROLEUM COKE CALCINATE

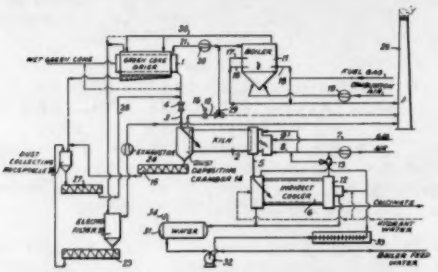
Max Dudek, and Otto Tieke, both of Lingen, Fed. Rep. of Germany, assignors to Wintershall Aktiengesellschaft, Kassel, Fed. Rep. of Germany

Filed Jul. 18, 1977, Ser. No. 817,115

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1976, 2633789

Int. Cl.[2] C10B *49/06, 51/00*

U.S. Cl. 201—27 **3 Claims**



1. An improved method of producing petroleum coke calcinate with a residual hydrocarbon content of not more than 0.1% by weight from wet green coke in a cylindrical rotary kiln with a one-way gas flow comprising the steps of

(1) indirectly drying the wet coke in a revolving dryer with flue gas having a temperature of 400°–450° C. to a residual moisture content of about 0.5–7.0% by weight;

(2) calcining and heating the dried green coke from step (1) in a revolving calciner;

(3) indirectly cooling the product of step (2) in a revolving cooler at a temperature of 100°–200° C.;

(4) removing simultaneously the dust-laden vapors from the indirect drying and calcining steps (1) and (2) and mixing the same with lean gas;

(5) burning the vapor-gas mixture from step (4) in a boiler-steam generator with air to a flue gas at a temperature of 400°–450° C.;

(6) conducting said flue gas to the indirect drying step (1) for heating purposes whereby the temperature of the flue gas decreases to about 280°–320° C.;

(7) separating coke dust from the cooled flue gas from step (6) electrostatically to a residual dust content on a dry basis of less than 100 mg/nm^3 in said flue gas;

(8) discharging the gas from step (7) to the atmosphere; and

(9) feeding coke dust collected in process steps (1), (2) and (7) in dose quantities to the dried-green coke being calcined in order to maintain a uniform flow behavior of the coke during calcination.

4,176,011

METHOD FOR OPERATING COKE OVEN CHAMBERS IN CONNECTION WITH A PREDRYING PLANT FOR THE COAL

Johannes Knappstein, Recklinghausen, Fed. Rep. of Germany, assignor to Firma Carl Still, Fed. Rep. of Germany

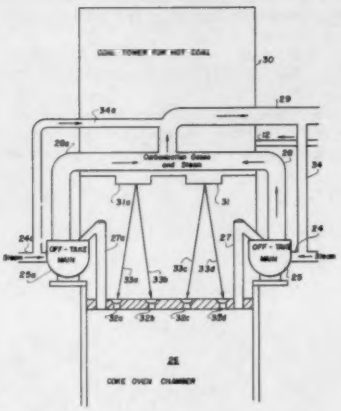
Filed Oct. 14, 1977, Ser. No. 842,100

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1976, 2647079

Int. Cl.[2] C10B *27/00, 57/10*

U.S. Cl. 201—40 **6 Claims**

1. A method of operating a coke oven battery in connection with a plant for predrying and preheating a coal to be coked, comprising preheating and/or predrying moist coke oven charge coal by bringing it into contact with a current of hot inert gas to remove water from the charge coal, and with the inert gas comprising a gas containing only a small amount of oxygen and the balance of nitrogen, carbon dioxide and steam, charging the preheated and/or predried coal into the coke



oven for heating the coal to form coke and coke oven gases, directing the coke oven gases generated in the coke oven out through an offtake, and adding an amount of steam to the offtake which corresponds approximately to the amount of water removed from the charge coals during preheating and/or predrying.

4,176,012

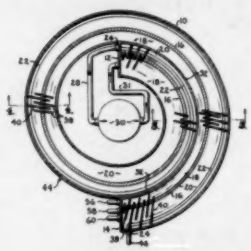
ADJACENT LOOP DISTILLATION

Jeffrey J. Bryant, 6727 Woodland, Shawnee, Kans. 66218

Filed Jan. 10, 1978, Ser. No. 868,440

Int. Cl.[2] C02B *1/06*

U.S. Cl. 202—172 **19 Claims**



1. Distillation apparatus comprising:

a substantially deaerated conduit having an inlet end and an outlet end with one of said ends being an inner end and the other an outer end, said conduit arranged in a generally spiral-like configuration about said inner end to present a plurality of generally laterally adjacent loops of said conduit extending continuously from said inner end to said outer end, each pair of adjacent loops presenting therein an upstream loop and downstream loop relative to said inlet end;

a partial partition in said conduit extending from said inlet to said outlet end and dividing the conduit into an inside distilland trough and an outside distillate trough for carrying an impure liquid to be distilled and the distillate derived therefrom, respectively; and

means communicating with said inlet end for delivering the

impure liquid to the distilland trough at a selected temperature and pressure and for flow of said impure liquid and vapor arising therefrom along said distilland trough toward said outlet end and accompanying flow of said vapor under centrifugal force across said partition to said distillate trough, whereby said vapor will tend to collect in said distillate trough and condense therein,

each pair of adjacent, upstream and downstream loops of said conduit having a common, heat-conducting wall between the distillate trough of the upstream loop and the distilland trough of the adjacent downstream loop,

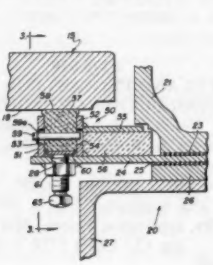
said common wall of each pair of adjacent loops transferring heat to the downstream distilland trough given off as the evaporating liquid condenses in the distillate trough of the upstream loop, whereby the impure liquid is continuously vaporized and condensed.

4,176,013

COKE OVEN DOOR SEAL ASSEMBLY

Donald R. Garthus, Perrysburg, and L. T. Robinson, Swanton, both of Ohio, assignors to Interlake, Inc., Oak Brook, Ill.

Filed Jan. 23, 1978, Ser. No. 871,182
Int. Cl.[2] C10B *25/16*
U.S. Cl. 202—242 **7 Claims**



1. In a coke oven having a door opening with a first surface extending around the periphery thereof and a door with a second surface extending around the periphery thereof and disposable in a closed configuration for closing the door opening, a door seal assembly comprising two spaced-apart retaining members mounted on one of said first and second surfaces and extending outwardly therefrom and cooperating therewith to define a channel, said retaining members being respectively provided with longitudinally spaced-apart pairs of laterally aligned openings therethrough, a resilient heat-resistant seal body secured in said channel between said retaining members and extending outwardly therebeyond for sealing engagement with the other of said first and second surfaces around the entire periphery thereof when the door is disposed in the closed configuration thereof, attachment pins respectively extending through said pairs of aligned openings and through said seal body for securing said seal body in said channel, continuous bearing means disposed in said channel between said seal body and said one of said first and second surfaces and extending substantially around the entire periphery thereof, and control means adjustably mounted for engagement with said bearing means to urge it throughout its length into engagement with said seal body with a variable pressure, whereby adjustment of said control means effects a corresponding adjustment of the pressure with which said seal body engages the other one of said first and second surfaces when the door is disposed in the closed configuration thereof.

4,176,014

PROCESS FOR THE PRODUCTION OF COIN BLANKS

Michael J. H. Ruscoe, St. Albert; Maurice A. Clegg, Fort Saskatchewan; Willie H. Seibt, Edmonton, and Kshitindra M. Sarkar, Saskatoon, all of Canada, assignors to Sherritt Gordon Mines Limited, Toronto, Canada

Filed Jan. 2, 1979, Ser. No. 36
Claims priority, application Canada, Oct. 31, 1978, 315495
Int. Cl.[2] C25D *7/00, 5/50, 17/20*
U.S. Cl. 204—23 **2 Claims**

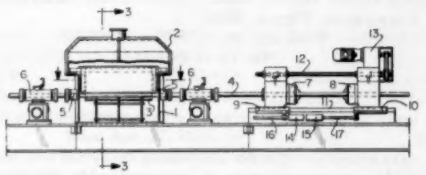
1. A process for the production of coin blanks suitable for minting into coins, including providing metal coin core pieces of disc-like shape each having opposed faces from about 14 mm to about 40 mm in diameter and a face to face thickness of from about 0.5 mm to about 2.6 mm, loading a charge of core pieces into a non-conducting perforated container with a diameter of from about 15 cm to about 50 cm, the number of core pieces in the container being such that the core pieces occupy from about $\frac{1}{3}$ to about $\frac{1}{2}$ of the container volume, placing the container in an electroplating bath, electroplating a metallic cladding on the core pieces, while moving the container angularly about a horizontal axis, at a voltage of from about 6 volts to about 18 volts and a current density of from about 470 A/m^2 to about 1400 A/m^2 based on the exposed area of the charge until a plating thickness of from about 0.03 mm to about 0.08 mm of metal has been deposited on each face of each core piece and a thickness of from about 2 to about 4 times the face thickness has been deposited on the circumference of each core piece, removing the cladded core pieces from the container, and heating the cladded core pieces to form a metallurgical bond between the metallic cladding and core piece of each cladded core piece and to reduce the hardness to less than 65 on the Rockwell 3OT hardness scale.

4,176,015

METHOD FOR CHROMIUM ELECTROPLATING OF BARS

Sergio Angelini, Milan, Italy, assignor to Fiat, S.p.A., Turin, Italy

Filed Oct. 19, 1977, Ser. No. 843,553
Claims priority, application Italy, Oct. 27, 1976, 28736 A/76
Int. Cl.[2] C25D *5/22, 7/00*
U.S. Cl. 204—28 **6 Claims**



1. A method for electroplating metal bars which comprises:

mechanically and electrically connecting said bars to form an uninterrupted row,

immersing in an electroplating bath an anode means adapted to substantially surround at least a portion of a bar while being spaced therefrom,

said anode means having a longitudinal slot therein,

mounting a stationary brush means in said slot adapted to contact a bar in the anode means,

passing the bars through the anode means in a straight path while rotating the bars about their longitudinal axes, and

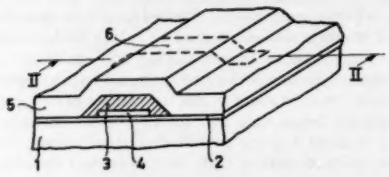
concurrently slideably forcing said stationary brush means against the bar,

whereby the bar surface is continuously cleaned by a brushing action during electroplating.

4,176,016
FORMING ELECTRICALLY INSULATING LAYERS BY SPUTTER DEPOSITION

Gerrit J. Koel, and Lambertus Postma, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 13, 1978, Ser. No. 877,167
Claims priority, application Netherlands, Feb. 15, 1977, 7701559
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—38 R **5 Claims**



1. A method of manufacturing an electrical device in which at a certain stage of the manufacture an electrically insulating layer is formed on the surface of a substrate bearing a metal pattern projecting above said substrate surface, said method comprising the step of growing the metal pattern on the substrate by electrodeposition and producing the electrically insulating layer by means of a two-stage sputter deposition process, characterized in that during the first stage of the sputter deposition process, a sputter-etching step is simultaneously performed at a rate which removes both electrically insulating material sputtered on to the edges of the metal pattern and electrodeposited metal at the edges and sides of the metal pattern so as to produce sides of said metal pattern which are inclined with respect to the substrate surface, but which rate of sputter-etching is just not sufficient to entirely remove the electrically insulating material sputtered on to the surface of the metal pattern which is substantially parallel to said surface of the substrate, the sputter etching step then being terminated and during the second stage of the sputter deposition process the sputtering of the electrically insulating layer being continued until said layer has a desired thickness.

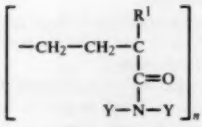
4,176,017
BRIGHTENING COMPOSITION FOR ACID ZINC ELECTROPLATING BATH AND PROCESS

Sylvia Martin, Detroit, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Filed Jan. 31, 1979, Ser. No. 7,740
Int. Cl.[2] C25D *3/22*
U.S. Cl. 204—55 R **9 Claims**

1. An aqueous zinc electroplating bath having a pH of about 0 up to about 6.5 containing an effective amount of a mixture of

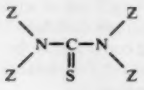
(a) a primary brightener comprising a polymer selected from the group consisting of polyacrylamide polymers and N-substituted polyacrylamide derivatives and copolymers thereof of the formula:



wherein:

Y may be the same or different and is R or RX, where R is H or C_{1-10} aliphatic radical, where X is H, OH, $COOR^1$, $COON[R^1]_2$, SO_3M, CN, $N[R^1]_2$ or OR, where M is H or a Group I or II metal; R^1 is H or C_{1-2} alkyl radical; and n is 2 to 2,000,000, and copolymers of said polymer and a solubilizing agent present in an amount up to 25 mole percent of the copolymer selected from the group consisting of methacrylic acid, acrylic acid, acrylonitrile, methacrylonitrile, vinyl C_{1-5} alkyl esters, vinyl halide, eiphalohydrin, vinylidine halide, alkylene oxide and mixtures thereof; and

(b) a secondary brightener and mixtures thereof selected from the group consisting of boric acid and Group I and II metal salts thereof; and/or thiourea and N-substituted derivatives thereof of the formula:



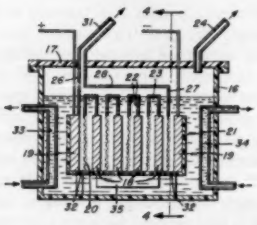
wherein:

Z may be the same or different and is R^2 or R^2X^1, where R^2 is H, C_{1-8} aliphatic radical, C_{6-10} aryl radical, C_{5-9} heterocylic nitrogen radical; where X^1 is H, OH, $COOR^3$, $COON[R^3]_2$, SO_3M^1, CN, $N[R^3]_2$, OR^3, or PO_4M^1, where R^3 is H or C_{1-2} alkyl radical and M^1 is H or a Group I or II metal, and where Z on one N can form a cyclic with Z on other N; and further including the sulfur adducts of said thiourea and N-substituted derivatives thereof selected from the group consisting of propane sultone, haloacetic acid, halosulfonic acid, and mixtures thereof.

4,176,018
ELECTROLYTE AND PROCESS FOR ELECTROLYTIC PRODUCTION OF FLUORINE

Robert Faron, Nyons, and Annie Cathala, Livron, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Continuation-in-part of Ser. No. 666,495, Mar. 12, 1976, Pat. No. 4,139,447. This application Nov. 3, 1978, Ser. No. 957,447
Claims priority, application France, Mar. 21, 1975, 75 09564
Int. Cl.[2] C25B *1/24, 9/00*
U.S. Cl. 204—60 **5 Claims**



1. In a process for the production of fluorine by electrolysis of a ternary electrolyte comprising as essential constituents $NH_4F+KF+HF$ in an electrolytic cell, the improvement comprising:

(a) operating the cell with the ternary electrolyte having the composition:

NH_4F = about 5 to about 20 mol % of NH_4F+KF

HF = about 40 to about 45% in weight percent of $NH_4F+KF+HF$;

and

(b) maintaining the working temperature of the electrolyte between about 50 and about 75° C.

4,176,019

PROCESS AND APPARATUS FOR TREATMENT OF WASTE GASES

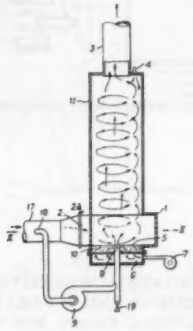
Finn H. Dethloff, Oslo, Norway, assignor to Ardal og Sunndal Verk a.s., Oslo, Norway and Alcan Research and Development Limited, Montreal, Canada

Filed Mar. 10, 1978, Ser. No. 885,209

Claims priority, application United Kingdom, Mar. 10, 1977, 10212/77

Int. Cl.[2] B04C *3/06;* B01D *53/06;* B01J *8/14;* C25C *3/06*

U.S. Cl. 204—67 25 Claims



24. In a method of operating a group of electrolytic cells for the electrolytic production of aluminium by passage of electric current between an anode and a cathode in electrical contact with a molten bath of a fluoride-containing flux in which alumina is dissolved, including drawing off a waste gas stream from said group of cells and passing said waste gas stream to a scrubbing system for removal of gaseous fluoride values therefrom, said system including one or more treatment chambers, the improvement which comprises diminution of gaseous fluoride components from said waste gas stream by treatment of said waste gas with a flow of particulate alumina in an amount substantially less than the total requirements of the group of cells by causing said waste gas stream to follow an upward helical path in said treatment chamber or chambers, introducing a flow of particulate alumina into said helical path, allowing said alumina to descend through said gas stream travelling in said helical path, collecting said alumina after contact with said gas in said helical path, supplying said collected alumina to a part of said group of cells and supplying fresh alumina to the remainder of said cells.

4,176,020

PROCESS FOR ELECTROLYTIC DIMERIZATION OF N-SUBSTITUTED PYRIDINIUM SALT

Teruyuki Misumi; Susumu Furuhashi, both of Yokohama, and Masaaki Shiga, Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 16, 1978, Ser. No. 887,131

Claims priority, application Japan, Mar. 23, 1977, 52/31108; Jan. 31, 1978, 53/8959

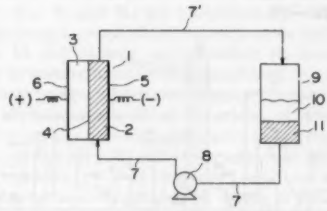
Int. Cl.[2] C25B *3/10*

U.S. Cl. 204—72 8 Claims

1. A process for the preparation of an N,N′-disubstituted tetrahydro-4,4′-bipyridyl by electrolytic dimerization of the corresponding N-substituted pyridinium salt which process is characterized by the steps of:

(1) flowing an aqueous catholyte containing an N-substituted pyridinium salt through an electrolytic cell having an anode, a cathode and at least one diaphragm disposed between the anode and the cathode at its cathode chamber at a linear velocity, in the cathode chamber, of at least 0.1 m/sec., said electrolytic cell being connected, through a circulation passage comprising a transferring passage and a feeding passage, with an extractor disposed outside said electrolytic cell, while applying electric current between said anode and said cathode, thereby to form an N,N′-disubstituted tetrahydro-4,4′-bipyridyl corresponding to said N-substituted pyridinium salt on the surface of the cathode and simultaneously remove said bipyridyl from the surface of the cathode into the aqueous catholyte flowing through the electrolytic cell;

(2) transferring the aqueous catholyte containing said bipyridyl to the extractor through the transferring passage and contacting said aqueous catholyte containing said bipyridyl with a water-immiscible organic solvent in said extractor to extract said bipyridyl into said organic solvent;



(3) separating the resulting aqueous phase from the resulting organic phase;

(4) feeding the separated aqueous phase alone back to the electrolytic cell through the feeding passage; and

(5) continuously repeating the steps (1), (2), (3) and (4).

4,176,021

FABRICATION OF ALKALINE BATTERIES

Thomas D. O'Sullivan, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 27, 1978, Ser. No. 973,712

Int. Cl.[2] C25B *1/00;* C25C *7/02*

U.S. Cl. 204—96 12 Claims

1. A process for producing alkaline batteries with nickel electrodes in which the nickel electrodes are made by electrolytic loading of a porous structure including the step of passing current through the porous structure, an aqueous electrolyte comprising nickel ions, and a counter electrode characterized in that the counter electrode is at least partially coated with a substance comprising cobalt compound with 50–60 weight percent cobalt.

4,176,022

REMOVAL OF PART PER BILLION LEVEL HARDNESS IMPURITIES FROM ALKALI METAL CHLORIDE BRINES

William B. Darlington, Portland, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 27, 1978, Ser. No. 900,457

Int. Cl.[2] C25B *1/16, 1/26;* C01F *25/32*

U.S. Cl. 204—98 32 Claims

1. A method of electrolyzing an alkali metal chloride brine in an electrolytic cell having an anolyte compartment separated from a catholyte compartment by a semi-permeable barrier which method comprises:

maintaining a calcium ion containing brine alkaline;

adding a phosphate chosen from the group consisting of phosphoric acid, sodium orthophosphate, sodium metaphosphate, sodium polyphosphate, potassium orthophosphate, potassium metaphosphate, potassium polyphosphate, and mixtures thereof to said alkaline brine whereby to form an insoluble precipitate having the stoichiomatic formula $(CaX_2) \cdot (Ca(PO_4)_2)_3$ wherein X is chosen from the group consisting of F, Cl and OH;

separating the precipitate from the brine;

feeding the brine, containing less than 20 parts per billion of calcium ion, to the anolyte compartment of the cell; and

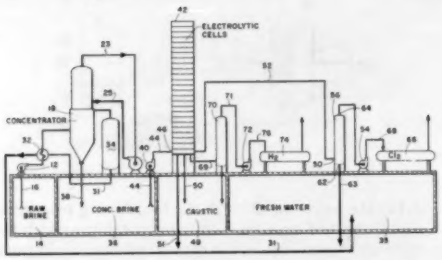
passing an electrical current through the cell.

4,176,023

DELSALINIZATION AND CHEMICAL EXTRACTION PROCESS

Donnie D. Childress, Braggs, Okla., assignor to Desal-Chem, Inc., Tulsa, Okla.

Filed Oct. 5, 1978, Ser. No. 948,668
Int. Cl.[2] C25B *1/28, 1/20;* **B01D** *3/10;* **C25B** *1/02*
U.S. Cl. 204—98 **3 Claims**



1. A combined desalinization and chemical extraction process for brinewater having a salinity of 7½% to 9% which method comprises introducing said brinewater into a concentrator of the type having closed upper and lower chambers interconnected by a plurality of parallel spaced vertical tubes surrounded by a closed shell extending between said chambers; heating said brinewater within said concentrator until the brinewater reaches its boiling temperature; withdrawing vapors from said upper chamber and separately compressing said vapors so as to create a partial vacuum within said upper chamber; introducing the compressed vapors into the concentrator in the spaces between said tubes and said shell so as to allow condensation in said spaces; removing condensed fresh water from said spaces between said tubes; removing brinewater concentrated to 28% salinity from said lower chamber; conducting said concentrated brinewater to a plurality of electrolytic cells having positively charged anodes and negatively charged cathodes; electrolyzing with low-voltage direct current said concentrated brinewater within said cells to release chlorine gas, caustic alkali containing primarily sodium hydroxide, a small amount of hydrogen gas and an inert material containing calcium and magnesium oxides; conducting said caustic alkali from said electrolytic cells; conducting said inert material from said electrolytic cells; conducting said chlorine gas from said electrolytic cells to a mist extractor separator to remove any impurities; compressing said pure chlorine gas to form liquid chlorine; and removing said hydrogen gas from said electrolytic cells.

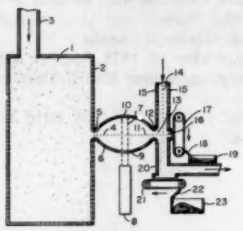
4,176,024

GAS DYNAMIC REACTION PROCESS AND SYSTEM FOR LASER CHEMISTRY

Max Garbuny, Wilkinsburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 28, 1975, Ser. No. 599,494
Int. Cl.[2] B01J *1/10;* **B01K** *1/00*
U.S. Cl. 204—157.1 R **28 Claims**

16. A method of preferentially activating an isotopic species in an isotopically mixed gas comprising producing a moving, unidirectional stream of said gas, the individual members of which have a forward component of velocity at least 10 times greater than their lateral component of velocity, directing a substantially monochromatic light beam at said stream, said light having a frequency which preferentially activates an isotopic species of said gas to an excitation state suitable for chemical reaction, said light beam being incapable of significantly deflecting activated members from non-activated members in said stream, and permitting said activated members and said non-activated members to travel intermixed together as a



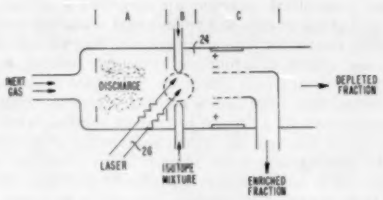
single stream without contact with non-gaseous matter until collected.

4,176,025

ISOTOPE DISSOCIATION SELECTIVE ELECTRON ATTACHMENT AND SEPARATION

Cheng-Lin Chen, and Peter J. Chantry, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 27, 1975, Ser. No. 608,306
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—157.1 R **7 Claims**



1. A method for separating a preselected fragment of a given molecule comprising a preselected isotope out of a gaseous mixture including the given molecule including the steps of:

at least partially confining the gaseous mixture within a bounded container;

selectively exciting the given molecule within the gaseous mixture with only one photon to raise the given molecule to an excited state below its ionization state;

exposing the excited molecules to free electrons generated from an electron source external of the gaseous mixture, having energy at least equal to the dissociation energy of the given molecule in its ground state minus the sum of the energy of the given molecule in its excited state over its ground state and the electron affinity of the fragment of the given molecule to which the electron attaches, which then dissociates to form fragments one of which is the preselected fragment;

concentrating the preselected fragments of the given molecule within a portion of the gaseous mixture so that the portion of the gaseous mixture receiving the concentration of the preselected fragments is substantially enriched in the preselected fragments; and

separating the portion of the gaseous mixture enriched in the preselected fragments resulting from dissociative electron attachment from the remainder of the gaseous mixture so the enriched portion can be processed to recover the preselected isotope in a preferred form.

4,176,026
PROCESS FOR CATALYTIC PHOTO-OXIDATION OF WATER

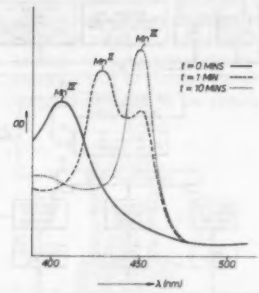
Anthony Harriman, and George Porter, both of London, England, assignors to National Research Development Corporation, London, England

Filed Apr. 12, 1978, Ser. No. 895,555

Claims priority, application United Kingdom, Apr. 13, 1977, 15369/77

Int. Cl.[2] **B01J** *1/10*

U.S. Cl. 204—157.1 R **19 Claims**



1. A process for the catalytic photo-oxidation of water by visible light which process comprises irradiating with light in the visible region of the spectrum a solution comprising:

(i) water,

(ii) as photocatalyst, a starting manganese complex which is a manganese (II) or manganese (III) complex of formula Mn L wherein L is a phthalocyanine ligand, a 5,10,15,20-tetraphenylporphyrin ligand or a 5,10,15,20-tetrapyridyl porphyrin ligand, each of said ligands optionally being substituted by further substituents, the said starting manganese complex being capable of undergoing a transition into an excited state on irradiation with visible light with subsequent conversion to the corresponding manganese (IV) complex, and

(iii) a compound which is an electron acceptor and which is a sufficiently powerful oxidising agent to abstract electrons from the excited manganese complex, the pH of the reaction mixture being chosen so that upon irradiation, the starting manganese complex will be oxidised to the corresponding manganese (IV) complex and the electron acceptor will be reduced to form a reduced electron acceptor and so that, subsequently, the manganese (IV) complex will be reduced back to the corresponding manganese (II) complex with concomitant conversion of water into oxygen.

4,176,027
SHAPED ARTICLE OF RADIATION CROSSLINKED TRIAZINE-TRIONE POLYMERIC COMPOSITION

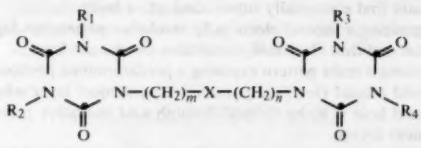
Alan J. Gotcher, Sunnyvale; Paul B. Germeraad, Palo Alto, and Larry J. White, San Jose, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Sep. 13, 1977, Ser. No. 832,969

Int. Cl.[2] **C08F** *8/00*

U.S. Cl. 204—159.15 **2 Claims**

1. A shaped article which article is the product of the process of subjecting a composition comprising a radiation crosslinkable polymer and from about 0.1 weight percent up to about 50 weight percent of at least one compound of the structural formula:



wherein R_1, R_2, R_3 and R_4 are independently vinyl, allyl, methallyl, propargyl, crotyl, C_1 to C_{18} alkyl or an aryl moiety having 6 to 14 ring carbons, any of which R_1 through R_4 groups may be unsubstituted or substituted with one or more inert substituent groups; wherein the X moiety is a saturated or unsaturated aliphatic moiety of 1 to 12 carbons, or saturated or unsaturated C_1 to C_{18} heteroaliphatic, a C_5 to C_{18} heteroaromatic, or C_5 to C_{18} alicyclic or heterocyclic, and wherein m and n are independently 0 or an integer of 1 to 12 to at least one forming operation at a temperature in excess of the melting point of the major polymeric constituent of said composition and thereafter subjecting said article to ionizing radiation at a dose level of about 1 to 40 megarads.

4,176,028
PLASTISOLS MADE WITH POLYELECTROLYTE BINDERS

Boynton Graham, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 22, 1977, Ser. No. 780,086

Int. Cl.[2] **C08F** *263/00*

U.S. Cl. 204—159.16 **11 Claims**

1. A thermally coalescible non-aqueous resin dispersion plastisol or organosol of single-phase particles of a random polymer or copolymer which comprises an organic polyelectrolyte that contains at least 1% by weight of an ionizable monomer or comonomer, said organic polyelectrolyte being polymer produced by the addition polymerization of ethylenically unsaturated monomer, dispersed in a medium that comprises a liquid that is nonvolatile at room temperature and is compatible with and a plasticizer for the resin, the liquid portion of said dispersion containing a photopolymerizable ethylenically unsaturated monomeric compound and at least one photoinitiator, said dispersion being coalescible to a clear dry film containing said organic polyelectrolyte and liquid plasticizer.

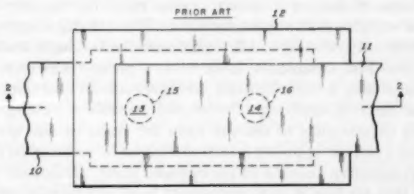
4,176,029
SUBMINIATURE BORE AND CONDUCTOR FORMATION

Don W. Jillie, Jr., Arlington, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 2, 1978, Ser. No. 882,826

Int. Cl.[2] **C23C** *15/00*

U.S. Cl. 204—192 S **8 Claims**



1. The method making a current controlling device including the steps of:

selecting a substrate,

depositing a first electrically super- conductive layer on said substrate,

depositing a first electrically insulative permanent layer on said first electrically super-conductive layer,

depositing a second electrically insulative permanent layer on said first electrically insulative permanent layer,

forming a resist pattern exposing a predetermined portion of said second electrically insulative permanent layer where said hole is to be formed through said insulative permanent layers,

exposing said second electrically insulative permanent layer to bombardment by reactive energized gaseous ions for forming a first portion of said hole,

removing said resist pattern,

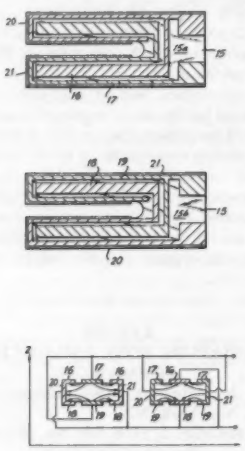
exposing said first electrically insulative permanent layer to an acid etch for forming a second portion of said hole, and

depositing a linking super-conductor within said hole and said second electrically super-conductive layer upon said second insulative permanent layer as an integral entity.

4,176,030
METHOD FOR FORMING A QUARTZ CRYSTAL VIBRATOR

Mutsumi Negita, Minowa, Japan, assignor to Matsushima Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 801,982, May 31, 1977. This application Apr. 26, 1978, Ser. No. 900,222
Claims priority, application Japan, May 31, 1976, 51-63135
Int. Cl.[2] C23C 15/00
U.S. Cl. 204—192 R **3 Claims**

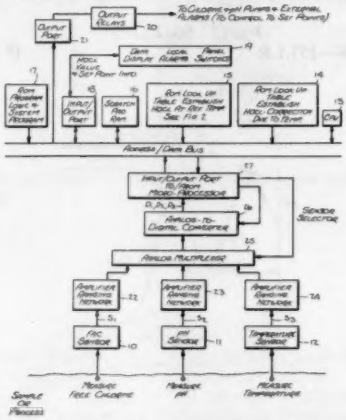


1. A method of forming a quartz crystal vibrator comprising the steps of coating a quartz crystal plate having opposed planar surfaces with a thin conductive film material adapted to be selectively resistant to a first predetermined etchant; coating said thin film conductive layer with a photo-resist layer to define at least a two electrode configuration on said opposed planar surfaces; applying a first etchant capable of cutting said quartz crystal plate to thereby form the shape of said quartz crystal vibrator; applying a second etchant to remove the thin film conductive material on the opposed planar surfaces of said plate that are free of said photo-resist layer and thereby define said electrode configurations on the opposed planar surfaces of said quartz crystal plate; and sputtering a thin conductive film layer on at least a portion of the side surfaces of said quartz crystal vibrator plate to electrically connect electrode configurations formed on the periphery of the opposed planar surfaces of the quartz crystal plate together.

4,176,031
DIGITAL HYPOCHLOROUS ACID ANALYZER

Richard Rosenblum, Doylestown, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Mar. 17, 1978, Ser. No. 887,482
Int. Cl.[2] G01N 27/46
U.S. Cl. 204—195 R **9 Claims**



1. An analyzer for continuously and accurately determining the hypochlorous acid content of chlorinated water containing free available chlorine having a hypochlorous acid component (HOCl) which is highly reactive, and a hypochlorite ion component (OCl^-) which is a less reactive disinfectant, said analyzer comprising:

first second and third probes to sense respectively the free available chlorine content (FAC), the pH factor and temperature in a sample of the chlorinated water to produce respective analog signals representative of these variables;

means to convert said analog signals into corresponding digital input data; and

a digital computer responsive to said input data to produce output data indicative of the HOCl content of the sample, said computer including a first memory storing the relationship existing at a reference temperature between the percentage of HOCl and OCl^- in a predetermined range of pH values, and a second memory storing the relationship existing between temperature and the equilibrium constant of HOCl, means consulting the first memory and responsive to the input pH data to establish the percentage of HOCl in the sample, means consulting the second memory and responsive to the input T data to correct the established percentage of HOCl to produce a temperature-corrected HOCl percentage value, and means to multiply the temperature-corrected percentage value with the input FAC data to produce an output representing the HOCl content.

4,176,032
CHLORINE DIOXIDE ANALYZER

Roberts G. Stevenson, Jr., New Britain, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Mar. 3, 1978, Ser. No. 883,284
Int. Cl.[2] G01N 27/46
U.S. Cl. 204—195 P **9 Claims**

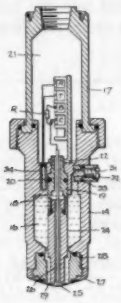
1. A system adapted to continuously and accurately measure the concentration of chlorine dioxide dissolved in water which also has oxygen dissolved therein, the system being provided with a sensor immersed in the water being tested to afford in situ measurements, said sensor comprising:

(A) an insulating casing having an electrolyte chamber therein whose open mouth is exposed to the water being

tested, said chamber being filled with an electrolyte constituted by a halide salt in a water solution;

(B) a membrane assembly covering the mouth of the chamber to isolate the chamber from the water, said assembly being provided with a hydrophobic diffusing membrane permeable to chlorine dioxide and impermeable to water whereby chlorine dioxide dissolved in the water diffuses through the membrane to enter into said chamber and react with said electrolyte;

(C) an electrode assembly disposed within said chamber, said assembly including a noble-metal measuring electrode and an oxidizable-metal counter electrode, said electrodes being bridged by the electrolyte to define an electrochemical cell which in the absence of chlorine dioxide produce a reaction causing the measuring electrode to become negatively polarized and the counter electrode to become positively charged and which in the presence of chlorine



dioxide produces a reaction causing the measuring electrode to become partially depolarized to render it receptive to electrons resulting from the oxidation of the counter electrode whereby the resultant current flow has an intensity depending on the concentration of the chlorine dioxide, said noble-metal being selected from a class consisting of gold and platinum and the oxidizable metal being selected from a class consisting of copper and silver, said electrolyte including a complexing agent to react with ions produced by the counter electrode to inhibit the build-up of an oxide layer thereon, thereby maintaining said counter electrode clean and functional; and

(D) means to impress a potential across said electrodes causing said cell to function in a current region in which dissolved oxygen in the water being tested offers no interference with said current flow as a function of chloride dioxide concentrations.

4,176,033

ANODE CLAMP ASSEMBLY AND METHOD OF INSTALLATION

James M. Council, Slidell, La., assignor to Exxon Production Research Company, Houston, Tex.

Filed Apr. 10, 1978, Ser. No. 895,212

Int. Cl.[2] C23F *13/00*

U.S. Cl. 204—197 **20 Claims**

1. An anode clamp assembly for connection to a submerged cylindrical support member for an offshore platform comprising;

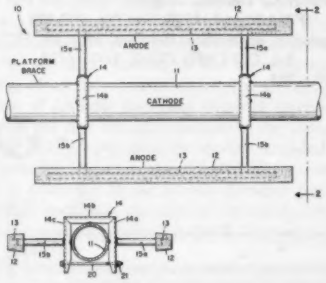
at least two U-shaped members each having three straight sides;

means for connecting the free ends of two of said sides of each U-shaped member to each other to clamp said U-shaped members to said support member, said sides of each of said U-shaped members contacting said support member at at least three spaced-apart points;

at least one metallic anode spaced from said U-shaped members and extending longitudinally of said support member;

a metallic core embedded in said anode and extending longitudinally therewith; and

at least two laterally extending arms connecting said core to at least one side of each of said U-shaped members providing electrical contact between said anode and said U-shaped members, each of said U-shaped members extending over said support member to facilitate clamping said U-shaped members to said support member.



4,176,034

APPARATUS FOR THE ELECTRODEPOSITION OF ALUMINUM

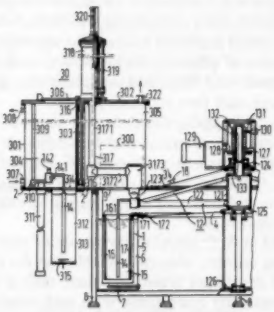
Klaus Stöger; Richard Dötzer, both of Nuremburg; Josef Stadter, Erlangen, and Johann Gehring, Spardorf, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 14, 1978, Ser. No. 896,378

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1977, 2716805

Int. Cl.[2] C25D *3/44, 5/34*

U.S. Cl. 204—200 **14 Claims**



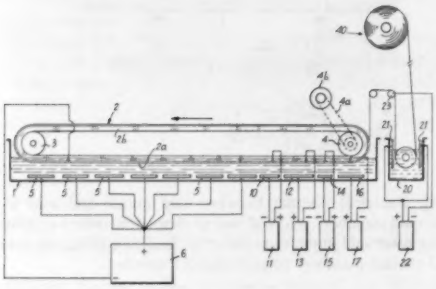
1. Apparatus for the electrodeposition of aluminum from aprotic, oxygen- and water-free, organo-aluminum electrolytes, comprising an electroplating trough which is closed to the outside and to which a protective gas can be admitted; a contact and holding device arranged within the electroplating trough; and a lock chamber which is arranged above the electroplating trough, can be flooded with protective gas and in which a work piece transfer device is arranged which can be operated from the outside, characterized by the feature that the lock chamber (**30, 40**) is subdivided by means of an intermediate door (**303, 403**) into an outer chamber (**304, 404**) with an outer lock door (**306, 406**) and a main chamber (**305, 405**) which is connected to the electroplating trough (**1, 2, 3, 4**) by an opening (**9, 10**), and that a work piece transfer device (**317, 417**) is provided which can be moved between the outer chamber (**304, 404**) and the main chamber (**305, 405**) if the intermediate door (**303, 403**) is open.

4,176,035

INSTALLATION FOR THE PRODUCTION OF A COPPER FOIL INTENDED TO BE APPLIED TO A DIELECTRIC SUBSTRATE

Antonio Pedone, Tournai, Belgium, assignor to Societe dite Coppertron S.A., Tournai, Belgium

Filed May 5, 1978, Ser. No. 903,120
Claims priority, application Belgium, May 10, 1977, 854450
Int. Cl.[2] C25D *17/00, 5/10, 3/38*
U.S. Cl. 204—205 **4 Claims**



1. An installation for the production of copper foils intended to be applied particularly to substrates of plastic material, comprising;

a first tank for containing an electrolytic solution therein;

an endless belt made of electrically conductive material mounted in said tank for continuous movement of the lower portion of the belt in one direction including means for immersing the lower surface of said lower portion in an electrolyte, contained in said tank

a first series of plates to be immersed in said electrolyte spaced from an upstream section of said lower portion of said endless belt, said series of plates comprising anodes and said endless belt comprising a cathode when subjected to an electrical potential having the appropriate polarity;

a second series of plates to be immersed in said electrolyte spaced from said belt and successively spaced downstream from said first series of plates;

means to apply to each of said second series of plates and to the respective portions of said belt adjacent each of said plates direct current potentials of respective alternate polarities whereby a layer of copper electrolytically deposited on said belt will be subjected to sudden interruptions of deposition;

and a second tank disposed downstream of said first tank for containing another electrolytic solution for depositing on the layer of copper from said dirst tank a thin layer of metal chemically compatible with said copper and with a plastic material with which the copper layer is to be associated.

4,176,036

ELECTRODE FOR PORTABLE ELECTROPLATING

Felix R. Rapids, 5050 S. East End Ave., Chicago, Ill. 60615

Continuation-in-part of Ser. No. 792,657, May 2, 1977, abandoned. This application Jul. 26, 1978, Ser. No. 928,070
Int. Cl.[2] C25D *17/14*
U.S. Cl. 204—224 R **8 Claims**

1. A plating applicator for electroplating a relatively soft metal onto a substrate comprising

an anode composed of said relatively soft metal,

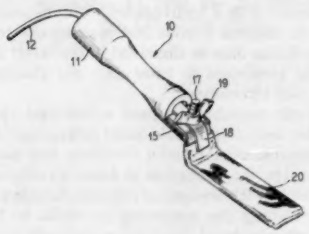
an electrically insulating handle,

a backing composed of a metal substantially harder than said relatively soft metal secured to said handle,

said backing having a plurality of countersunk apertures therethrough,

said anode being in firm contact with one face of said backing and having integral protuberances extending therefrom and exactly filling said apertures,

said protuberances having flattened terminal portions extending flush with the other face of said backing by cold flow of said portions into the countersunk apertures to hold said soft metal anode into firm engagement with said backing.

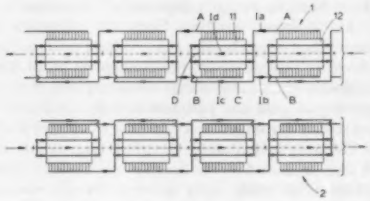


4,176,037

CONDUCTOR ARRANGEMENT FOR COMPENSATING FOR HORIZONTAL MAGNETIC FIELDS IN POTS CONTAINING A MOLTEN ELECTROLYTIC BATH

Hans G. T. Nebell, Snaroya, Norway, assignor to Årdal og Sunndal Verk a.s., Norway

Filed Jun. 16, 1978, Ser. No. 917,019
Claims priority, application Norway, Jul. 14, 1977, 772507
Int. Cl.[2] C25C *3/16*
U.S. Cl. 204—243 M **4 Claims**



1. In a plant for the melt-electrolytic production of aluminum, said plant being of the type including a plurality of pots arranged in at least one longitudinal row, means for serially passing current through said row of pots from one end of said row to the opposite end thereof, such that each of said pots has a positive upstream end and a negative downstream end, taken in the longitudinal direction of said row, said passing means including, for each said pot, anode means for receiving said current from the adjacent upstream pot and for introducing said current into the said positive upstream end of said each pot, and cathode means for collecting said current from said each pot and supplying said current to the said anode means of the adjacent downstream pot, the improvement comprising:

means for compensating for detrimental magnetic horizontal fields occurring at the said positive upstream end of each said pot, said compensating means comprising, for each said pot, at least one conductor means for bypassing a minor portion of said current from said positive upstream end of said each pot to said negative downstream end thereof, and for supplying said minor portion of said current to said negative downstream end, said minor portion comprising a maximum of 20% of the total anode current supply to said each pot, said conductor means extending longitudinally beneath said each pot, centrally thereof, and closely adjacent the bottom thereof.

4,176,038

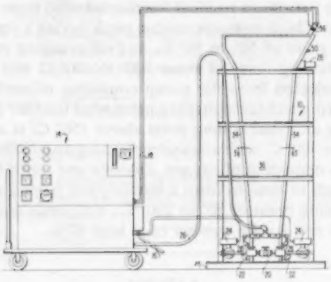
WATER PURIFICATION METHOD AND APPARATUS

Karl Moeglich, Williamsville, N.Y., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 663,790, Mar. 4, 1976, Pat. No. 4,094,755, which is a continuation-in-part of Ser. No. 613,289, Sep. 15, 1975, which is a continuation of Ser. No. 487,730, Jul. 11, 1974. This application Mar. 22, 1978, Ser. No. 888,939

Int. Cl.[2] C02B *1/82;* C25B *9/00*

U.S. Cl. 204—277 15 Claims



1. An apparatus for purifying water to agglomerate solids suspended therein for subsequent removal comprising:

a vessel having front, rear, and side walls, and having an inlet therein for admitting water to be purified and an outlet for water and agglomerated solids, the side walls of said vessel lying in a plane disposed at a vertical angle to the horizontal axis of said vessel;

at least one pair of upstanding electrodes disposed within said vessel between the inlet and the outlet, said electrodes having opposed, spaced, metal faces defining with the side walls of said vessel a water treatment chamber, said chamber being in communication with the vessel inlet and outlet;

means coupled to said electrodes for applying an alternating current thereto of a frequency of from 0.2 to 800 Hz with a current density of 0.08 to 6 amps per square inch;

means carried by said device for directing water to be purified through the inlet into said vessel, through the treatment chamber and subsequently for directing treated water from said vessel through the outlet;

means carried by said device for agitating the water to be purified, within the treatment chamber, to maintain said water in turbulence while said water is disposed between said electrodes;

conductive means disposed within said chamber between said electrodes for enhancing the alternating electrical field across said electrodes when water to be purified is disposed within said chamber.

4,176,039

ELECTROPLATING RACK

Joseph C. Wismer, 10 Sussex Rd., Bergenfield, N.J. 07621

Filed Mar. 2, 1979, Ser. No. 16,806

Int. Cl.[2] C25D *17/06, 17/08;* H01R *7/08*

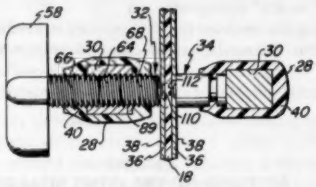
U.S. Cl. 204—297 W 38 Claims

1. In an electroplating rack in which an item to be plated is secured upon the rack for immersion in a plating solution and electrical contact is made between the rack and the item, a clamp for securing and electrically connecting the item to the rack, said clamp comprising:

a clamp frame including a core of conductive material connected to the rack and a sheath of resilient insulating material covering the core;

a threaded opening in the clamp frame, the threaded opening including a first threaded portion extending through the core and having opposite ends, a second threaded portion extending from one of the opposite ends through a corresponding portion of the sheath and a third threaded portion extending from the other of the opposite ends through a further corresponding portion of the sheath;

a clamp screw having an actuating head, a clamp face and a threaded shank extending axially between the actuating head and the clamp face for reception within the threaded opening, the threaded shank including a first threaded portion of electrically conductive material for engaging the first threaded portion of the threaded opening and making electrical contact therewith, a second threaded portion of resilient insulating material extending axially between the first threaded portion of the threaded shank and the head for engaging the second threaded portion of the threaded opening, the relative dimensions and the relative resilience of the second threaded portion of the threaded shank and the second threaded portion of the threaded opening being such that a first seal is established



upon engagement of said second threaded portions, a third threaded portion of resilient insulating material extending between the first threaded portion of the threaded shank and the clamp face for engaging the third threaded portion of the threaded opening, the relative dimensions and the relative resilience of the third threaded portion of the threaded shank and the third threaded portion of the threaded opening being such that a second seal is established upon engagement of said third threaded portions, whereby the first and second seals effectively isolate the engaged first threaded portions from the plating solution;

the clamp face including a conductive surface for engaging the item;

conductive means interconnecting the conductive surface with the first threaded portion of the threaded shank; and

a clamp pad on the clamp frame opposite the threaded opening for enabling the item to be clamped between the clamp screw and the clamp pad.

4,176,040

COAL LIQUEFACTION

Robert N. Hazlett, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 8, 1978, Ser. No. 903,464

Int. Cl.[2] C10G *1/00;* C10B *57/12*

U.S. Cl. 208—8 LE 15 Claims

1. A method for converting coal to liquid hydrocarbon or oil-soluble solids which comprises:

contacting said coal with oxygen for at least 15 minutes at a temperature from about 90° to about 225° C. to produce oxidized coal, said coal being a powder or admixed with a liquid which is nonreactive with oxygen, nitrogen, and coal and comprises an aromatic or heteroaromatic liquid hydrocarbon without any oxygen or sulfur in the ring structure;

heating said oxidized coal to a temperature from about 250° C. to about 450° C.; and

maintaining said temperature for at least about 15 minutes.

4,176,041

METHOD FOR REFORMING LOW GRADE COALS

Kenji Mori, Nishinomiya; Mamoru Taniuchi, and Shigeo Yaguchi, both of Kobe, all of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed Feb. 23, 1978, Ser. No. 880,708
Claims priority, application Japan, Feb. 24, 1977, 52/19615; Feb. 25, 1977, 52/20531
Int. Cl.[2] C10G *1/06*
U.S. Cl. 208—10 12 Claims

1. A method for reforming low grade coal for the production of metallurgical coke which comprises:

admixing a steam coal, the ash content of which is not more than 5 weight percent, an iron oxide catalyst containing at least 40 weight percent of iron in a proportion of no more than 3 weight percent based on said coal, on an ash-free, dry basis and sulfur as a co-catalyst with a solvent to prepare a slurry;

heat-treating the slurry in a reducing gaseous atmosphere at an elevated pressure and at a temperature in the range of 400° to 450° centigrade; and

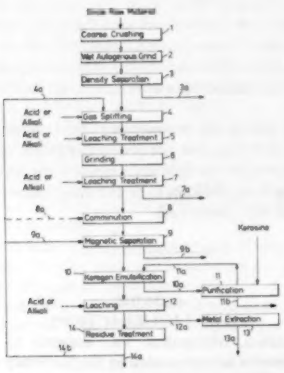
distilling the resultant reaction mixture at a reduced pressure of 40 to 150 mmHg and an elevated temperature of 280° to 350° centigrade to separate a reformed coal carbonaceous material suitable for the production of metallurgical coke.

4,176,042

METHOD OF TREATING SHALES

Per A. H. H. Fahlström, Akers Runö, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Continuation of Ser. No. 778,966, Mar. 18, 1977, abandoned.
This application Oct. 25, 1978, Ser. No. 954,429
Claims priority, application Sweden, Mar. 25, 1976, 7603646
Int. Cl.[2] C10G *1/04*
U.S. Cl. 208—11 LE 13 Claims



1. A method of recovering kerogen from bituminous sedimentary rock comprising crushing the sedimentary rock and finely-dividing the crushed rock in a plurality of comminuting stages to a particle size of a fineness sufficient to substantially free the major part of the kerogen and any sulphides present in the rock so as to permit a subsequent separation of kerogen and any sulphides, subjecting the sedimentary rock, at least prior to the final one of said comminuting stages, to a leaching treatment with a leaching solution selected from acidic and basic solutions operative to selectively weaken mechanical bonds between minerals contained in said sedimentary rock to enable said rock to be more readily divided in said final comminuting stage, and subsequent to said final comminuting stage, recovering kerogen and any sulphides by physically separating the same from the leached and finally comminuted rock.

4,176,043

PROCESS FOR PREPARING BINDER PITCHES

Johannes N. van Eijk, Uithoorn, Netherlands, assignor to Cindu Chemie B.V., Uithoorn, Netherlands

Filed Jun. 20, 1977, Ser. No. 808,175
Claims priority, application Netherlands, Jun. 23, 1976, 7606820
Int. Cl.[2] C10C *1/16, 3/02*
U.S. Cl. 208—44 11 Claims

1. A process for preparing a binder pitch which comprises: intimately contacting a mixture, with a weight ratio of from 9:1 to 1:9, of a petroleum residual fraction selected from the group consisting of high aromatic residue pitch having a ring and ball softening point of 50° to 80° C. and oil cracking residual oil having a boiling range of about 300° to 400° C. and a coal tar fraction selected from the group consisting of coal tar pitch having a ring and ball softening point of at least 80° C. and tar oil having an initial boiling point above 350° C. at a temperature above 300° C. with a dehydrogenating agent selected from the group consisting of oxygen, chlorine and sulfur for a sufficient length of time to form a binder pitch having a ring and ball softening point of 50° to 200° C., a C_2 resin content of at least 15% and a coke number of at least 40%.

4,176,044

PROCESS FOR ALKYLATING WAXY HYDROCARBONS WITH C_3–C_5 CARBON ATOM SECONDARY ALCOHOLS AS CATALYST

Anthony M. White, Brights Grove, Canada, assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 824,276, Aug. 15, 1977, abandoned.
This application May 22, 1978, Ser. No. 908,525
Int. Cl.[2] C10G *23/52*
U.S. Cl. 208—46 14 Claims

1. A process for alkylating normally solid, waxy hydrocarbons to liquid hydrocarbons boiling primarily in the lube oil range which comprises contacting said waxy hydrocarbons with a low molecular weight olefin and with a catalyst consisting essentially of one or more C_3–C_5 carbon atom secondary alcohols at elevated temperature and pressure to alkylate a substantial portion of the wax to relatively high VI, low pour point lube oil components.

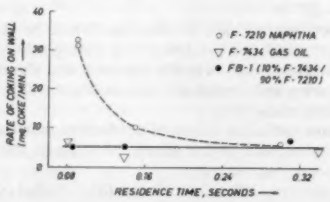
11. A process for dewaxing a wax-containing lube oil stock which comprises contacting said stock with a C_2–C_{10} carbon atom olefin in a reaction zone at elevated temperature and pressure and with a catalyst consisting essentially of one or more C_3–C_5 carbon atom secondary alcohols to alkylate a portion of said wax to lube oil components thereby producing a lube oil stock of reduced wax content and reduced pour point.

4,176,045

PYROLYSIS COKE INHIBITION

Harry P. Leftin, and David S. Newsome, both of Houston, Tex., assignors to Pullman Incorporated, Chicago, Ill.

Filed Jul. 10, 1978, Ser. No. 923,519
Int. Cl.[2] C10G *9/16;* C07C *11/04*
U.S. Cl. 208—48 R 6 Claims



1. In a process for the production of olefins by steam pyrolysis of normally liquid hydrocarbon feedstock at a residence

time of from about 0.02 to about 0.2 seconds in a tubular furnace wherein coke deposits on the interior surface of the furnace tubes, the improvement which comprises:

(a) blending an inhibiting portion of normally liquid hydrocarbon having a Coking Inhibition Index (CII) greater than about 10 into a steam pyrolysis feedstock having a CII less than about 10 to form a blended feedstock wherein the minimum inhibiting portion expressed as weight percent of the blended feedstock equals

$$\frac{100}{\text{Average } CII} \text{ and}$$

Average CII = Arithmetical Average of the Coking Inhibition Indeces (CII) of blended feedstock components

$$CII = 153.4 - \left[5.1 \sqrt{BMCI}\,(1 + \frac{S}{1.3}) + 2API \right]$$

$$BMCI = \frac{48640}{VABP} + 473.7\,(SG) - 456.8$$

$VABP$ = volume average boiling point (°K.)
SG = specific gravity (15.6° C./15.6° C.)
S = weight percent sulfur

$$API = \frac{141.5}{SG} - 131.5$$

(b) introducing the blended feedstock to the tubular furnace, and

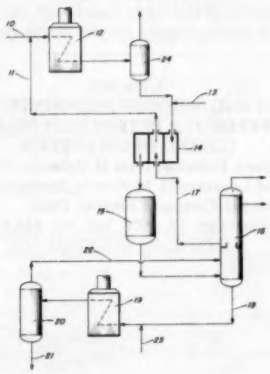
(c) recovering an olefins-containing effluent from the tubular furnace.

4,176,046

PROCESS FOR UTILIZING PETROLEUM RESIDUUM

James R. McConaghy, Jr., Ponca City, Okla., assignor to Conoco, Inc., Ponca City, Okla.

Filed Oct. 26, 1978, Ser. No. 955,278
Int. Cl.² C10G 9/14, 37/02
U.S. Cl. 208—50 **4 Claims**



1. A process for making premium delayed coke from a petroleum refinery vacuum residuum feedstock comprising:

(a) subjecting said feedstock to a hydrogen donor diluent cracking step;

(b) subjecting the effluent from the cracking step to a flash separation;

(c) subjecting the liquid effluent from said flash separation to a catalytic hydrodesulfurization step;

(d) fractionating the effluent from said hydrodesulfurization step to produce light ends, distillates, a hydrogen donor diluent stream and a bottoms stream;

(e) utilizing said hydrogen donor diluent stream as the hydrogen donor diluent in step (a); and

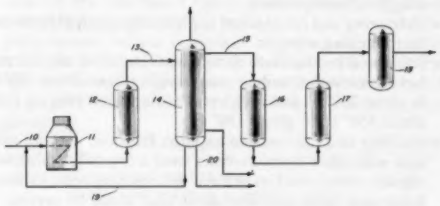
(f) subjecting said bottoms stream to a delayed coking process conducted at premium coking conditions and recovering premium delayed coke.

4,176,047

REMOVAL OF ORGANIC COMPOUNDS FROM COKER GASOLINE

Derrell D. Orrell, and Melvin M. McFeeters, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Apr. 10, 1978, Ser. No. 894,978
Int. Cl.² C10G 37/00
U.S. Cl. 208—51 **4 Claims**



1. In a refinery process including a delayed coking operation in which organic silicon compounds are added to the coker feedstock to control foaming, and wherein a hydrocarbon stream in the gasoline boiling range obtained by fractionation of overhead vapors from the coking step is processed through a desulfurizer and then through a reformer unit, the improvement comprising:

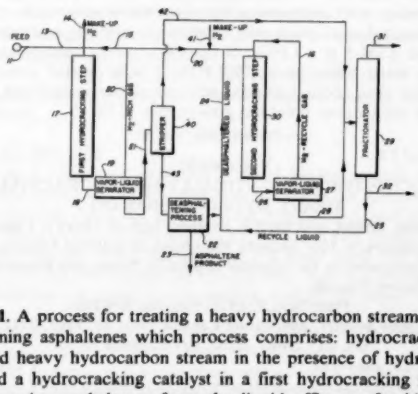
passing said coker gasoline, prior to passing it through said desulfurizer, through a bed of spent desulfurization catalyst capable of removing a substantial portion of said organic silicon compounds.

4,176,048

PROCESS FOR CONVERSION OF HEAVY HYDROCARBONS

Joseph B. Corns, Munster, Ind.; Thomas D. Nevitt, and Waldemar R. Hertwig, both of Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 31, 1978, Ser. No. 956,280
Int. Cl.² C10G 23/02, 37/06, 13/02
U.S. Cl. 208—59 **8 Claims**



1. A process for treating a heavy hydrocarbon stream containing asphaltenes which process comprises: hydrocracking said heavy hydrocarbon stream in the presence of hydrogen and a hydrocracking catalyst in a first hydrocracking zone, removing asphaltenes from the liquid effluent of said first hydrocracking zone to form a deasphaltened liquid, and hydrocracking said deasphaltened liquid in the presence of hydrogen and a hydrocracking catalyst in a second hydrocracking zone.

4,176,049

CATALYTIC CRACKING PROCESS

William E. Winter, and William L. Schuette, both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Apr. 3, 1978, Ser. No. 892,938
Int. Cl.[2] C10G *37/10*
U.S. Cl. 208—70 **15 Claims**

1. A process for the production of a high octane gasoline comprising

cracking a sulfur-bearing hydrocarbon feed in a first cracking zone over a cracking catalyst at conditions sufficient to obtain a cat cracked naphtha product containing from about 10 percent to about 60 percent olefins, based on the weight of said product,

withdrawing said cat cracked naphtha as a product from said first cracking zone,

splitting said product into components inclusive of a fraction having a low end boiling point ranging from about 150° F. to about 250° F. and a high end boiling point ranging from about 350° F. to about 450° F.,

recracking said cat cracked naphtha fraction, without dilution with other hydrocarbons, over a crystalline aluminosilicate zeolite catalyst in a second cracking zone to desulfurize said feed, and saturate at least about 50 percent of said olefins, based on the weight of said cat cracked naphtha,

hydrofining the product of said second cracking zone over a hydrogenation catalyst at hydrofining conditions in a hydrofining zone sufficient to form a feed suitable for reforming over a sulfur-sensitive noble metal reforming catalyst, and then

reforming said hydrofined, recracked fraction over a sulfur sensitive noble metal reforming catalyst at reforming conditions to form a high octane gasoline.

4,176,050

PRODUCTION OF HIGH V.I. LUBRICATING OIL STOCK

Nai Y. Chen, Titusville; William E. Garwood, Haddonfield, and Alan W. Peters, Moorestown, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 4, 1978, Ser. No. 966,419
Int. Cl.[2] C10G *13/02*; C07C *5/24*; B01J *29/28*
U.S. Cl. 208—111 **15 Claims**

1. In a process for manufacturing a refined lubricating oil stock having a V.I. of at least 85 and a pour point not greater than +20° F. from a waxy stock boiling within the range of from about 450° to about 1050° F., said process comprising catalytically dewaxing said waxy stock to a pour point not greater than +20° F., the improvement whereby effecting said dewaxing with increased selectivity, which comprises: contacting said waxy stock with a catalyst comprising macrocrystalline ZSM-5 at a LHSV of from 0.1 to 5.0, a temperature from about 500 to about 750° F., and under a total pressure greater than about 100 psia; and recovering a dewaxed oil stock with a pour point not greater than +20° F.

4,176,051

PROCESS FOR CATALYTICALLY HYDROCRACKING A HEAVY HYDROCARBON OIL

Marten Ternan, and Basil I. Parsons, both of Ottawa, Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of Energy, Mines and Resources, Ottawa, Canada

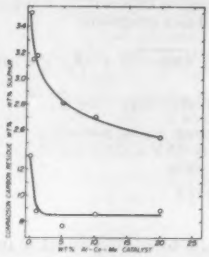
Filed Nov. 9, 1978, Ser. No. 959,256
Claims priority, application Canada, Nov. 18, 1977, 291229
Int. Cl.[2] C10G *13/02, 23/02*; B01J *35/02*
U.S. Cl. 208—112 **7 Claims**

1. A process for catalytically hydrocracking a heavy hydrocarbon oil, comprising,

(a) heating the heavy hydrocarbon oil to a temperature in the range 50° C. to 400° C., then

(b) mixing the heavy hydrocarbon oil, while at the temperature in the range 50° C. to 400° C., with a particulate catalyst mass to form a slurry, the particulate catalyst mass being in the range 0.1 to 10 weight percent of the slurry and comprising discrete catalyst supports of at least one material selected from the group consisting of coal and coke with each catalyst support coated with a catalytically active aluminum compound and at least one catalytically active material selected from the group consisting of compounds of metals of Group VI (b) and Group VIII of the Periodic Table of Elements,

(c) mixing the slurry with hydrogen gas and heating the mixture to a temperature in the range 250° C. to 550° C., then



(d) continuously feeding the mixture while at the temperature in the range 250° C. to 550° C. to a lower end portion of a catalytic hydrocracking reactor vessel,

(e) causing the mixture to flow upwardly in the reactor vessel at a pressure in the range 100 to 3,500 psig and at a temperature in the range 400° C. to 500° C. so that gaseous and vapour phase components liberated from the mixture in the reactor vessel rise rapidly therein and separate from residual liquid phase and entrained particulate solids components which flow slowly upwardly therein, and

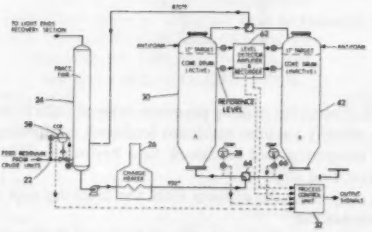
(f) continuously withdrawing the gaseous and vapour phase components and the liquid phase with entrained particulate solids from an upper portion of the reactor vessel.

4,176,052

APPARATUS AND METHOD FOR CONTROLLING THE RATE OF FEEDING A PETROLEUM PRODUCT TO A COKING DRUM SYSTEM

Charles R. Bruce, Littleton; Irvin D. Johnson, Englewood, both of Colo., and Lawrence H. McGrievy, Robinson, Ill., assignors to Marathon Oil Company, Findlay, Ohio

Filed Oct. 13, 1978, Ser. No. 954,941
Int. Cl.[2] C10G *9/5*; G06G *7/58*
U.S. Cl. 208—131 **13 Claims**



1. A system for producing a coke product from a petroleum product in combination with a process control unit for automatically predicting an optimal flow rate of petroleum into the system, said combination comprising:

a coking drum for forming a coke product from the petroleum and having a preestablished coking drum level;

measuring means for producing a first signal representative of measuring the flow rate of the petroleum product as it flows into said coking drum;

analog-to-digital converter means for producing binary signal information corresponding to said first signal;

integrating means for computing an incremental quantity of petroleum delivered to said coking drum from said binary signal information representing said flow rate;

accumulator means for receiving each incremental quantity of petroleum delivered and storing a totalized quantity thereof;

storage means for receiving predetermined coking system parameters;

means for predicting an optimal flow rate of petroleum using said totalized quantity stored in said accumulator means and said predetermined coking system parameters so that an optimal quantity of coke is produced in said coking drum;

first output means responsive to said predicting means to produce a data output signal representing said optimal flow rate of petroleum;

digital-to-analog converter means for producing a first analog signal corresponding to said optimal flow rate; and

flow rate control means responsive to said digital-to-analog converter means for adjusting the flow rate of petroleum so that the petroleum is delivered to said coking drum at said optimal flow rate.

4,176,053

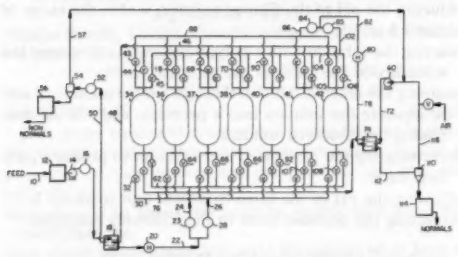
N-PARAFFIN - ISOPARAFFIN SEPARATION PROCESS

Thomas C. Holcombe, Scarsdale, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 31, 1978, Ser. No. 892,334

Int. Cl.[2] C10G *25/04*

U.S. Cl. 208—310 Z **5 Claims**



1. In the process for separating normal paraffins from admixture with non-normal paraffins which comprises passing a feedstock mixture of same in the vapor state and at superatmospheric pressure periodically in sequence through each of at least four fixed beds of a system containing a zeolitic molecular sieve adsorbent having effective pore diameters of substantially 5 Angstroms, each of said beds cyclically undergoing the stages of:

(a) adsorption-fill, wherein the vapor in the bed void space consists principally of a non-sorbable purge gas and the incoming feedstock forces the said non-sorbable purge gas from the bed void space out of the bed without substantial intermixing thereof with non-adsorbed feedstock fraction;

(b) adsorption, wherein the feedstock is cocurrently passed through said bed and the normal constituents of the feedstock are selectively adsorbed into the internal cavities of the crystalline zeolitic adsorbent and the non-adsorbed constituents of the feedstock are removed from the bed as an effluent reduced in content of non-feedstock constituents;

(c) void space purging, wherein the bed loaded with normals adsorbate to the extent that the stoichiometric point of the mass transfer zone thereof has passed between 85 and 97 percent of the length of the bed and containing in the bed void space a mixture of normals and non-normals in essentially feedstock proportions, is purged countercurrently, with respect to the direction of adsorption stage (b), by passing through the bed a stream of a non-sorbable purge gas in sufficient quantity to remove said void space feedstock vapors but not more than that which produces about 50 mole percent of adsorbed feedstock normals in the bed effluent; and

(d) purge desorption, wherein the selectively adsorbed feedstock normals are recovered as a product stream by passing a non-sorbable purge gas countercurrently with respect to adsorption stage (b) through the bed until the major proportion of adsorbed normals has been desorbed and the bed void space vapors consist principally of non-sorbable purge gas;

the improvement which comprises recycling directly in the vapor phase in combination with feedstock the mixture of normals and non-normals purged from each bed of the system during stage (c) to another bed of the system undergoing stage (b) adsorption.

4,176,054

WASTE PAPER RECYCLING

Joseph A. Kelley, 65 W. Jackson Blvd., Chicago, Ill. 60604

Filed May 16, 1977, Ser. No. 796,897

Int. Cl.[2] B03C *1/00*

U.S. Cl. 209—8 **20 Claims**

1. A method of treating paper comprising the steps of:

providing a magnetic material in an adhesive substance to form a magnetic adhesive for binding together paper sheets;

applying said magnetic adhesive to a selected part of said paper sheets for securing said sheets together along a common edge;

cutting said secured together sheets of paper into a plurality of relatively small pieces so that a first group of said pieces has bits of said magnetic adhesive adhering thereto and a second group of said pieces is free of said magnetic adhesive;

passing all said pieces through a magnetic field for attraction toward a magnetic collector only those pieces of said first group having said magnetic adhesive adhering thereto; and

separating the unattracted pieces of said second group of pieces from those magnetically attracted pieces of said first group of pieces.

4,176,055

ROTARY AIR CLASSIFIER

Patrick Corrigan, Retford, England, assignor to Newell Dunford Engineering Limited, England

Filed Nov. 1, 1977, Ser. No. 847,495

Claims priority, application United Kingdom, Aug. 15, 1977, 34238/77

Int. Cl.[2] B07B *4/06*

U.S. Cl. 209—152 **8 Claims**

1. In a classifier comprising a vessel having an axis and opposite open ends, means mounting the vessel for rotation in one direction about the axis with said axis inclined, said open ends being an upper open end and a lower open end, means for feeding material to be classified into the upper open end, and means for introducing into the vessel a flow of air in a direction substantially tangential to the interior wall of the vessel, the improvement comprising:

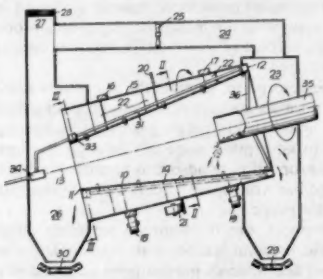
(a) means for rotating the vessel in the same direction as the direction of said flow of air about said axis,

(b) a plurality of individual jet orifices arranged along at least a portion of the length of said vessel for said introduction of the flow of air as a plurality of concentrated jets, and

(c) said vessel being frusto-conical in shape with said upper open end being larger than said lower open end and with

the lower surface of the interior wall of the vessel sloping downwards towards said lower open end,

whereby said flow of air from said jet orifices causes an



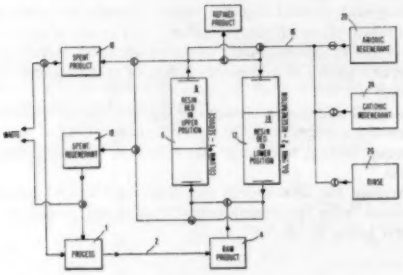
induced additional flow of air from said lower open end to said upper open end and itself smoothly flows spirally within the conical vessel towards said upper open end during use of said classifier.

4,176,056

CYCLIC OPERATION OF A BED OF MIXED ION EXCHANGE RESINS

Jesse G. Grier, Gilbertsville, Ky., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Apr. 27, 1978, Ser. No. 900,454
Int. Cl.[2] B01D *15/04*
U.S. Cl. 210—20 **10 Claims**



1. In a cyclic method for the removal of ions from an aqueous feed solution by passing said feed solution through a column containing a bed of mixed anion and cation exchange resins having a specific gravity difference, said difference being no more than about 0.2, said bed being capable of moving upward or downward en masse in said column, and thereafter removing said ions from said bed and regenerating said exchange resins, the improvement which comprises the steps of:

(a) passing said feed solution upward through said bed at a rate sufficient to move said bed upward en masse whereby ions are removed from said feed solution by adsorption on at least one of said exchange resins;

(b) after terminating the flow of said feed solution through said bed, passing an ion accepting aqueous solution through said bed whereby said ions are at least substantially removed from said bed;

(c) after terminating the flow of said ion accepting aqueous solution, passing an aqueous regenerating solution through said bed for regenerating the exchange resin which adsorbed said ions; and

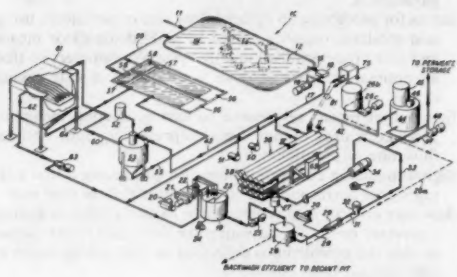
(d) after terminating the flow of the regenerating aqueous solution, repeating said steps.

4,176,057

METHOD AND APPARATUS FOR RECOVERING LIQUID AND SOLID CONSTITUENTS OF WATER SOLUTIONS CONTAINING SPARINGLY SOLUBLE SOLIDS

Robert T. Wheatley, and Louis J. Kosarek, both of El Paso, Tex., assignors to El Paso Environmental Systems, Inc., El Paso, Tex.

Filed Jun. 24, 1977, Ser. No. 809,751
Int. Cl.[2] B01D *31/00, 13/00*
U.S. Cl. 210—23 H **13 Claims**



2. The method of recovering liquid and solid constituents of water solution containing sparingly soluble solids which comprises:

adjusting the temperature of the water solution within a temperature range of about 60° to 95° F.,

adjusting the pH of the solution within the range of about 7 to 8,

filtering the thus adjusted solution,

reducing the pH of the filtered solution within the range of about 5 to 5.5,

reacting the solution with a polyphosphonate to increase the solubility of the solids in the solution,

pumping the reacted solution through a reverse osmosis unit to separate the solution into a permeate and a brine containing the dissolved solids,

decarbonating the permeate from said unit to produce purified water,

adjusting the pH of the brine from said unit to about 7,

subjecting the adjusted brine to the following reactions:

1. $X_2(Y)_3 + 3Z(HCO_3)_2 \rightarrow 3ZY + 2X(OH)_3 + 6CO_2$

2. $X(HCO_3)_2 + Z(OH)_2 \rightarrow 2ZCO_3 + 2H_2O$

wherein:

X is a trivalent cation such as boron, aluminum, scansium, reduced titanium, chromium, manganese, oxidized iron, oxidized cobalt, oxidized nickel, gallium, arsenic, yttrium, reduced niobium, reduced molybdenum, rhodium, indium, reduced antimony, lanthanum, iridium, gold, oxidized thallium, reduced bismuth or the rare earths,

Y is a divalent anion such as sulfate, molybdate, phosphate, chromate, mangnate, arsenate, borate, fluorosilicate, germanate, nitrite, oxalate, sulfite, tellurite, thiosulfate, tungstate or uranate,

Z is a divalent cation such as beryllium, magnesium, calcium, reduced vanadium, reduced chromium, reduced manganese, reduced iron, reduced cobalt, reduced nickel, copper, zinc, strontium, palladium, cadmium, barium, reduced platinum, oxidized mercury, lead, polonium, or radium,

separating the liquid and solid products of said reactions, and recycling the separated liquid to the water solution for further recovery therewith.

4,176,058

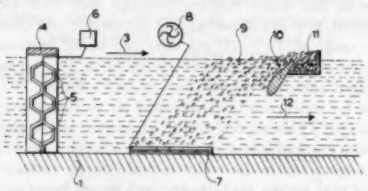
METHOD MEANS FOR DE-SILTING WATER

Jacobus J. Grobler, Sophia St. 25, Risiville, Vereeniging 1930, Transvaal, South Africa

Continuation of Ser. No. 517,526, Oct. 24, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,302

Int. Cl.[2] **B01D** *21/01;* **C02B** *1/20*

U.S. Cl. 210—44 **22 Claims**



1. A method for removing silt particles from a natural flow of water having a substantial concentration of natural, essentially inorganic silt, which comprises:

(a) essentially non-specifically, with the aid of a chemical agglomerating agent, agglomerating at least a major portion of the silt particles to form the same into agglomerated particles of substantially increased size,

(b) hydrophobically treating the agglomerated particles, essentially in a non-specifically manner, whereby the same are imparted with hydrophobic properties,

(c) preventing settling of said treated particles by bubbling air through the water thereby floating the agglomerated particles to the surface of the water, and

(d) removing the floated agglomerated particles.

4,176,059

ANTI-CORROSION COMPOSITION FOR USE IN AQUEOUS SYSTEMS

Fumiko Suzuki, Guelph, Canada, assignor to Quatic Chemicals Limited, Guelph, Canada

Filed Jun. 8, 1978, Ser. No. 913,555

Int. Cl.[2] **C02B** *5/04, 5/06;* **C23F** *11/08*

U.S. Cl. 210—58 **13 Claims**

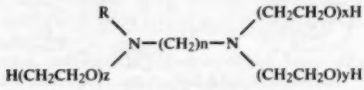
1. A water treatment composition for addition to water for contacting metal surfaces to inhibit corrosion thereof and deposition of scale thereon, said composition consisting essentially of:

from about 3 to about 100 parts by weight of water soluble molybdate ion,

from about 0.5 to about 100 parts by weight of at least one water soluble or dispersible organic non-ionic or cationic surfactant

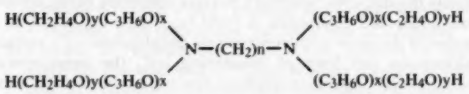
said surfactant being selected from the group consisting of:

(i) surfactants of the general formula:



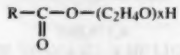
wherein R represents a saturated or unsaturated hydrocarbon radical having from 8 to 20 carbon atoms; n is an integer from 1 to 10; x, y and z are integers of sum 0 to 15;

(ii) surfactants of the general formula:



wherein n is an integer from 1 to 10; each x represents an independently selected integer such that the average molecular weight of each group (C_3H_6O) is from about 3,000 to about 10,000; each y represents an independently selected integer such that the polyethylene oxide groups (C_2H_4O) constitute from about 10% to about 30% of the total molecular weight of the surfactant molecule;

(iii) surfactants of the general formula:



in which R represents a saturated or unsaturated aliphatic hydrocarbon radical having 8 to 20 carbon atoms; x is an integer from about 90 to about 140; and

(iv) ethylene oxide-propylene oxide polymers having a molecular weight of from about 2000 to about 5000;

from about 0.3 to about 100 parts by weight of an inorganic water soluble polyphosphate;

and from about 0.05 to about 30 parts by weight of an azole selected from the group consisting of triazoles, pyrazoles, imidazoles, isooxazoles, isothiazoles, thiazoles and thiadiazoles, said composition being effective in corrosion inhibition when added to water in amounts of from about 3 to about 330 parts of composition per million parts of water.

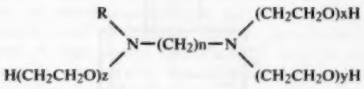
7. A process of controlling metal corrosion and scale deposition of metal surfaces exposed to aerated aqueous systems, which comprises including in one million parts by weight of the aqueous system a corrosion and scale inhibiting, substantially water soluble amount in the range from about 3 to about 330 parts by weight of a composition consisting essentially of:

from about 3 to about 100 parts by weight of water soluble molybdate ion,

from about 0.5 to about 100 parts by weight of at least one water soluble or dispersible organic non-ionic or cationic surfactant

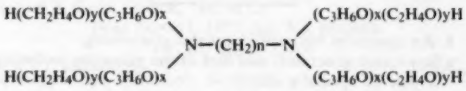
said surfactant being selected from the group consisting of:

(i) surfactants of the general formula:



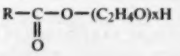
wherein R represents a saturated or unsaturated hydrocarbon radical having from 8 to 20 carbon atoms; n is an integer from 1 to 10; x, y and z are integers of sum 0 to 15;

(ii) surfactants of the general formula:



wherein n is an integer from 1 to 10; each x represents an independently selected integer such that the average molecular weight of each group (C_3H_6O) is from about 3,000 to about 10,000; each y represents an independently selected integer such that the polyethylene oxide groups (C_2H_4O) constitute from about 10% to about 30% of the total molecular weight of the surfactant molecule;

(iii) surfactants of the general formula:



in which R represents a saturated or unsaturated aliphatic hydrocarbon radical having 8 to 20 carbon atoms; x is an integer from about 90 to about 140; and

(iv) ethylene oxide-propylene oxide polymers having a molecular weight of from about 2000 to about 5000;

from about 0.3 to about 100 parts by weight of a water soluble inorganic polyphosphate;
and from about 0.05 to about 30 parts by weight of an azole selected from the group consisting of triazoles, pyrazoles, imidazoles, isooxazoles, isothiazoles, thiazoles and thiadiazoles.

4,176,060

PROCESS FOR SOLUBLE CYANIDE REMOVAL FROM WASTEWATER STREAMS

Yel S. Sury, and Melvin J. Guillory, Jr., both of Baton Rouge, La., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 3, 1978, Ser. No. 866,439
Int. Cl.[2] C02B *1/36*
U.S. Cl. 210—62 **11 Claims**

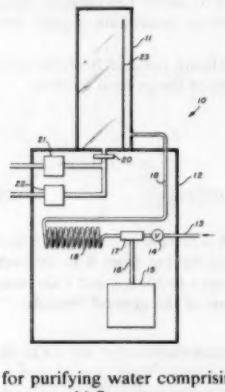
1. A method for removing soluble iron cyanide complexes present in an aqueous stream which comprises contacting said aqueous stream containing measurable amounts of cyanide with a concentration of hydrochloric acid sufficient to lower the pH of the system to a level of 3 or below, heating the acidic system to a temperature of at least about 80° C. and contacting the heated acidic system with a source of chlorine.

4,176,061

APPARATUS AND METHOD FOR TREATMENT OF FLUID WITH OZONE

Karel Stopka, 625 Rhode Island, Apt. 3, San Francisco, Calif. 94107

Filed Mar. 6, 1978, Ser. No. 883,401
Int. Cl.[2] C02B *1/38*
U.S. Cl. 210—63 Z **7 Claims**



1. An apparatus for purifying water comprising:
a first ozone generator, said first ozone generator including a pair of spacially displaced electrodes and means for creating an ionizing electrostatic field between said electrodes, said electrodes defining a passage for the flow of gas through said first ozone generator;
at least a second ozone generator, said second ozone generator including a pair of spacially displaced electrodes and means for creating an ionizing electrostatic field between said electrodes, said electrodes of said second ozone generator defining a passage for the flow of gas through said second ozone generator;
means connecting the gas flow passages of said first and second ozone generators in a series, said connecting means comprising a conduit;
means for delivering air to a first end of the gas flow passage of said first ozone generator whereby a corona discharge will be established in said first ozone generator and the air will be partially ozonated, the ozone concentration in the air thereafter being increased in said second ozone generator to a percent by weight of the air exiting said second ozone generator exceeding 1.2%;
a fluid treatment conduit, said fluid treatment conduit being partially in the form of a spiral and having a length of at least 10 feet, said fluid treatment conduit having an inner diameter of less than 1 inch and being free of turbulence promoting irregularities;
means for supplying water to be purified to a first end of said fluid treatment conduit under a pressure of at least two atmospheres;
means for producing and causing entrainment of microbubbles in the water flowing through said fluid treatment conduit, said microbubbles having an average diameter in the range of 10 to 20 microns and being uniformly dispersed in the water, said entrainment causing means being located adjacent the first end of said conduit;
means for delivering the ozonated air exiting the gas flow passage of said second ozone generator as the supply gas to said entrainment causing means whereby the microbubbles entrained in the water include ozone molecules; and
storage tank means, said storage tank means being connected to the discharge end of said fluid treatment conduit.

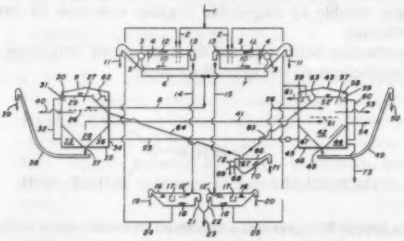
7. A method for the purification of water comprising:
establishing a corona discharge in an air stream to partially ionize the air and generate ozone molecules;
establishing a second corona discharge in the stream of partially ionized air to increase the percent by weight of ozone in the air stream to an amount exceeding 1.2%, the sequential subjection of the air stream to the first and second corona discharges being spaced in time;
dividing the ionized air stream into microbubbles having an average diameter of from 10 to 20 microns;
entraining the microbubles in a stream of water to be purified;
maintaining a hydraulic pressure of at least two atmospheres in said stream of water while causing the stream to travel along a spiral path for a distance of at least ten feet while the ozone molecules are dissolved therein; and
collecting the water stream in a storage container.

4,176,062

PROCESS FOR THE SEPARATION OF FOAM FROM EFFLUENTS OF COKE OVEN PLANTS

Lee K. Husher, Bethel Park, Pa.; Heinrich Weber, and Kurt Tippmer, both of Recklinghausen, Fed. Rep. of Germany, assignors to United States Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 656,211, Feb. 9, 1976, abandoned. This application Jan. 4, 1977, Ser. No. 756,700
Int. Cl.[2] B01D *35/18*; C10C *1/03, 3/18*
U.S. Cl. 210—72 **2 Claims**



1. In a process for the separation of the mixture of tar and ammonia liquor produced in the manufacture of coke from finely divided coal, wherein a mixture consisting of tar, ammonia liquor and condensate is freed from coarse particles in a primary decanter with concomitant development of a surface suspension and foam of "swimming tar", the improvement wherein the suspension and foam floating on the surface of the ammonia liquor in the primary decanter is removed by traveling mechanical skimmers, delivered to a foam separator, and permitted to reside in the foam separator for at least two hours to effect separation of a water phase, removing the water phase

from the foam separator, and recycling it to the primary decanter.

4,176,063

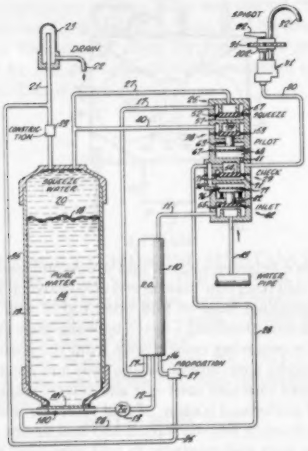
WATER PURIFIER SYSTEM AND VALVE

Truman V. Tyler, Grass Valley, Calif., assignor to Richard W. Beall, Jr., Manhattan Beach; Robert B. Sprague, Long Beach; Louis J. Favara, Thousand Oaks and Gausewitz, Carr & Rothenberg, Orange, all of, Calif., part interest to each

Filed Oct. 21, 1977, Ser. No. 844,374

Int. Cl.[2] C02B *1/82*

U.S. Cl. 210—101 **36 Claims**



1. A reverse-osmosis water purification system, which comprises:

(a) a reverse-osmosis filter element,

(b) a storage tank having movable means therein to separate said tank into a pure water chamber and a squeeze chamber,

(c) means to conduct tap water under pressure to said filter element and to cause water to flow through said filter element into said pure water chamber,

(d) means to conduct waste water from said filter element to a drain,

said means (d) including proportioning means to determine the ratio of said waste water to pure water,

(e) a single water conduit connected at one end to said pure water chamber, and adapted to be connected at the other end to an outlet valve which controls discharge of purified water to a point of use,

said water conduit being the sole conduit between the water purification system and the region of said outlet valve,

(f) means, including a squeeze-control valve to conduct water under pressure to said squeeze chamber,

whereby to move said movable means and thus expel purified water from said pure water chamber through said single conduit to said outlet valve,

(g) means to reduce greatly the water pressure in said squeeze chamber after closing of said squeeze-control valve,

whereby to create a large pressure drop across said filter element, with consequent increased rate of filtration,

(h) means to maintain substantial water pressure in said single conduit after said reduction in water pressure in said squeeze chamber, so that purified water will flow immediately out said outlet valve upon opening thereof,

(i) means, responsive to the pressure reduction caused by said opening of said outlet valve and consequent reduction in the water pressure in said single conduit, to open said squeeze-control valve and thus effect expulsion of purified water through said single conduit to a point of use, and

(j) means, responsive to filling of said storage tank with a predetermined quantity of purified water, to prevent flow of water through said proportioning means to said drain, whereby to prevent loss of water after a desired amount of purified water is present.

4,176,064

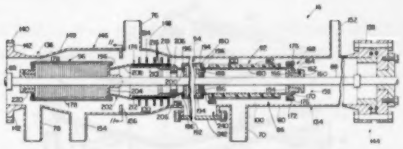
MIXTURE CONCENTRATOR

Donald S. Black, Edmonton, Canada, assignor to Palmer Engineering Company Ltd., Edmonton, Canada

Continuation-in-part of Ser. No. 808,276, Jun. 20, 1977, Pat. No. 4,126,181. This application Nov. 15, 1978, Ser. No. 960,841

Int. Cl.[2] B01D *45/14*

U.S. Cl. 210—196 **30 Claims**



1. A concentrator for removing part of a medium from a mixture of media comprising:

an elongate vessel having an intake for the mixture, a concentrated mixture outlet, and a removed medium outlet; and

an elongate rotor rotatably mounted for rotation in a forward direction inside said vessel so as to define a concentric channel between said vessel and said rotor, said concentric channel being in communication with said mixture intake and said concentrated mixture outlet, said rotor having an internal passageway and comprised of an intake impeller means in communication with said rotor passageway for permitting flow into said rotor passageway of medium removed from the mixture introduced into said vessel at said intake, and removed medium discharge means for discharging the removed medium from said passageway to said removed medium outlet, said concentric channel providing a flow path for the mixture being concentrated by the removal of the medium.

4,176,065

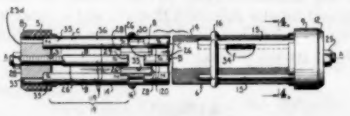
MAGNETIC FILTER

Robert J. Cook, Clinton, Mo. 64735

Filed Nov. 21, 1977, Ser. No. 853,082

Int. Cl.[2] B01D *35/06*

U.S. Cl. 210—223 **3 Claims**



1. An elongated magnetic element that is insertable into the central cavity of an annular screening element, said magnetic element comprising:

a. clusters of elongated magnets, said clusters being aligned in an end-to-end relationship on a common longitudinal axis, the magnets of a cluster being spaced apart from each other, oriented axially in relation to said axis, and located outwardly from said axis in a radial pattern,

b. spacers that are located along said axis at intervals, the magnets of said cluster being abutted with at least one of said spacers and retentively engaged thereon, and wherein the maximum width of said cluster is greater than the

maximum width of the spacer with which the magnets of said cluster are abutted,

c. said spacers having a body portion with two ends, a periphery that extends around said axis, and said recesses are peripheral recesses that originate at one end of said body portion and lead inwardly thereon.

4,176,066

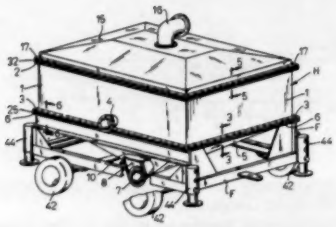
GRAVITATIONAL FLOW SEPARATOR OF THE MULTIPLE, APERTURED TUBE TYPE FOR SEPARATING WATER FROM SAND, GRAVEL OR THE LIKE

Albert H. Sloan, 4201 Kean Rd., Fort Lauderdale, Fla. 33314

Filed Jul. 5, 1978, Ser. No. 922,038

Int. Cl.[2] B01D *23/06*

U.S. Cl. 210—241 **19 Claims**



19. A dewatering device for separating water from sand and gravel or the like, said device including an enclosing housing, a series of vertically disposed tubular members in said housing and having upper ends connected together by means of an upper generally horizontal wall, said housing including an upper cover located above said tubular members, a solids and water mixture inlet located adjacent the top of said cover whereby said mixture is introduced into said cover for flooding over said horizontal wall and into said tubular members, each of said tubular members having a series of small horizontally disposed slits therein, a lower generally horizontal floor in said housing and around the lower end of said tubular members and connecting the latter, said housing also including a downwardly and convergingly tapering bottom section located beneath said tubular members and said floor for receiving sand and gravel from said tubular members, a discharge outlet adjacent the bottom of said bottom section for solid material which is collected adjacent the bottom of said bottom section, and means to divert a portion of water which has been discharged through said slits to gravity flush solid material through said discharge outlet, and a gate valve adjacent a lower part of said bottom section, said floor receiving water that has been discharged through said slits in said tubular members, said horizontal floor having means for removably supporting said tubular members therein, and a water outlet in said housing for conducting said water from said housing after said water has passed through said slits.

4,176,067

LABEL ACCUMULATOR AND CAUSTIC SEPARATOR

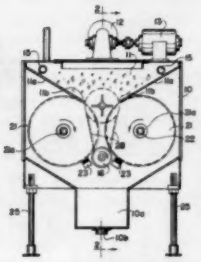
Michael Vamvakas, Rocky River, Ohio, assignor to Niagara Bottle Washer Mfg. Company, Cleveland, Ohio

Filed Jun. 29, 1978, Ser. No. 920,238

Int. Cl.[2] B01D *33/06*

U.S. Cl. 210—256 **5 Claims**

1. Apparatus for separating loose paper pieces from a bath of caustic soda comprising a housing having generally imperforate sides and bottom, a reservoir in the upper part of said housing to receive a quantity of a mixture of caustic soda and pieces of paper, said reservoir having a bottom with perforated openings about 1/16 inch in diameter, said bottom sloping toward the center and having terminating edges in an elongated opening at the center, means for agitating the contents of said reservoir, means for flushing said sloping bottom toward the center, an elongated helical screw conveyor in said housing spaced below and parallel to said elongated opening discharging outside of said housing, means for driving said conveyor when desired, a perforated conveyor sleeve closely surrounding said conveyor on the bottom and sides leaving an open top, two cylindrical drums mounted in said housing for intermittent rotation on axes parallel to said screw conveyor and spaced intermediate the level of said elongated opening and the level of said screw conveyor and equally on opposite sides of a line between said opening and said conveyor, and there being a



slight clearance between each of said drums and said terminating edges of said reservoir bottom and also between said drums and the longitudinal sides of said open top of said conveyor sleeve, said drums providing a space between their peripheries, and means for removing caustic soda from the bottom of said housing, whereby a mixture of caustic soda and pieces of paper may be pumped into said reservoir and caustic soda is filtered through said perforated bottom of said reservoir and intermittingly said conveyor may be started and said drums rotated to propel paper from said reservoir to said conveyor and thence outside of said housing, thus recovering caustic soda for reuse.

4,176,068

METHOD FOR THE SEPARATION FROM EACH OTHER OF THE COMPONENTS OF A MIXTURE OF WATER, OIL AND DIRT (SLUDGE) AS WELL AS APPARATUS FOR PERFORMING SAID METHOD

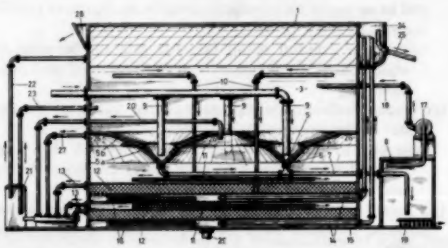
Hendrik J. Ankersmit, Havendijk 177, Schiedam, Netherlands

Filed May 8, 1978, Ser. No. 904,123

Claims priority, application Netherlands, May 10, 1977, 7705154

Int. Cl.[2] B01D *23/02*

U.S. Cl. 210—295 **9 Claims**



1. Apparatus for separating the components of a mixture of water, oil and sludge on the basis of their differing physical properties, comprising a container, a conduit for the supply of the mixture to be treated, a conduit for the discharge of oil separated in the upper part of the container and a conduit for the discharge of water separated from and collected below the oil, the container being divided into a first chamber and a second chamber positioned generally below said first chamber,

the bottom of the first chamber being provided with one or more upwardly widening separating chambers into each of which a supply conduit debouches for the mixture to be separated and a discharge conduit for heavy sludge being connected to the narrow part of said one or more upwardly widening separating chambers, said discharge conduit being dimensioned to have a flow capacity corresponding to the sludge volume supply, whereas one or more conduits are provided connecting the first chamber and the second chamber, said conduit or conduits having upper inlets positioned above the level of the mouthes of the supply conduits for the transfer of light fractions of the mixture from the first chamber to the second chamber and upper side of a filter disc or package formed by a plurality of filter discs, said second chamber having conduits for the discharge of separated oil from the upper side of the filter disc or discs, for the discharge of cleaned water and for the discharge of sludge adjacent to the lower side of said filter disc or discs.

4,176,069

DEVICE FOR EXCHANGING SUBSTANCES AND METHOD OF MANUFACTURING THE DEVICE

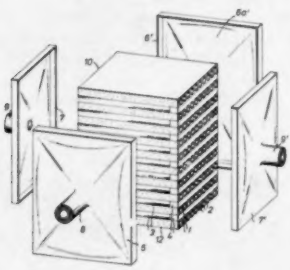
Hellmut Metz, and Henning Kage, both of Wedel, Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Fed. Rep. of Germany

Filed May 23, 1977, Ser. No. 799,518

Claims priority, application Fed. Rep. of Germany, May 21, 1976, 2622684

Int. Cl.[2] B01D *31/00*

U.S. Cl. 210—321 B **6 Claims**



1. A device for exchanging first and second substances, in particular an oxygenator or dialyzer, comprising a casing, a stack of alternate layers of semi-permeable membrane layers having a plurality of substantially parallel capillary tubes extending therethrough for flow in one direction and porous tissue layers for flow therethrough in a direction transverse to said one direction, spacer means disposed at each end of said tissue confining the flow through the tissues therebetween, said alternate layers being disposed in said casing, first and second connecting pieces connected to respective sides of said casing at respective sides of said stack having a first inlet conduit at one end of said tubes for the flow of the first substance to said capillary tube and a first outflow conduit at the opposite end of said casing and said tubes for the flow of the first substance out of said capillary tubes, and first and second connecting pieces connected to respective ends of said casing and said tissue layers having a second inflow conduit for the inflow of the second substance into said porous tissues and a second outflow conduit for the outflow of the second substance out the other end of said porous tissues.

4,176,070

SEMI-PERMEABLE MEMBRANES OF REGENERATED CUPRAMMONIUM CELLULOSE AND METHOD FOR HEAT STERILIZATION THEREOF IN PHYSIOLOGICAL SALINE

Yutaka Sakurada, Kyoto; Kimihisa Sunahara, Saiki, and Kazuhisa Yamauchi, Kyoto, all of Japan, assignors to Kuraray Co., Ltd. and Kawasumi Laboratories, Inc., both of Kurashiki, Japan

Filed Mar. 15, 1978, Ser. No. 886,949

Claims priority, application Japan, Mar. 18, 1977, 52-30782; Oct. 27, 1977, 52-130159; Nov. 14, 1977, 52-137139

Int. Cl.[2] A61L *1/00;* **B01D** *13/04, 39/18*

U.S. Cl. 210—500 M **7 Claims**

1. A method for sterilizing a semi-permeable membrane of regenerated cuprammonium cellulose which comprises subjecting said semi-permeable membrane to heat treatment at a temperature of 105° to 140° C. in the presence of physiological saline.

6. A hollow fiber membrane of regenerated cuprammonium cellulose which has a sonic modulus of at least 6.5×10^{10} dynes/cm^2 and has been sterilized at a temperature of 105° to 140° C. in the presence of physiological saline.

4,176,071

CORROSION INHIBITOR MIXTURE FOR AMMONIUM SULFATE FIRE-RETARDANT COMPOSITIONS AND METHOD FOR INHIBITING CORROSIVITY OF SUCH COMPOSITIONS

Robert L. Crouch, Phoenix, Ariz., assignor to Early California Industries, Inc., Phoenix, Ariz.

Filed Jun. 26, 1978, Ser. No. 919,166

Int. Cl.[2] C09K *3/28*

U.S. Cl. 252—8.1 **2 Claims**

1. A corrosion inhibitor mixture for ammonium sulfate fire-retardant compositions, said compositions generally including

ammonium sulfate,

a thickening agent, and

water,

said mixture comprising:

(a) a water-soluble cyanide compound; and

(b) a water-soluble ortho-phosphate compound,

said components of said corrosion inhibitor system being present in said fire-retardant composition in a minor effective amount at least sufficient to inhibit the corrosivity of said fire-retardant composition to aluminum, mild steel and brass to less than 1 mil per year.

4,176,072

DIESEL ENGINE CRANKCASE LUBRICATING OIL COMPOSITION

Philip F. Jackisch, Royal Oak, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed Mar. 22, 1978, Ser. No. 889,015

Int. Cl.[2] C10M *1/48*

U.S. Cl. 252—32.7 E **5 Claims**

1. A lubricating oil composition especially adapted for use in the crankcase of diesel engines in the presence of blow-by carbon soot, said composition comprising a major amount of lubricating oil and the combination of an oil soluble zinc dihydrocarbyldithiophosphate and about 0.25–3.0 weight percent of a sulfurized fatty acid ester of an anhydrohexitol, said zinc dihydrocarbyldithiophosphate in the absence of said sulfurized fatty acid ester tending to increase engine wear due to soot and said zinc dihydrocarbyldithiophosphate is present in an amount sufficient to provide from 0.005 to 0.5 weight percent zinc to the composition

4,176,073

MOLYBDENUM COMPLEXES OF LACTONE OXAZOLINE DISPERSANTS AS FRICTION REDUCING ANTIWEAR ADDITIVES FOR LUBRICATING OILS

Jack Ryer, East Brunswick; Esther D. Winans, Colonia; Stanley J. Brois, Westfield, and Antonio Gutierre, Mercerville, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Sep. 18, 1978, Ser. No. 943,206

Int. Cl.[2] C10M *1/54, 1/48;* **C10L** *1/30;* **C07F** *11/00*

U.S. Cl. 252—32.7 E **17 Claims**

1. An oil-soluble molybdenum complex of a lactone oxazoline dispersant having from 0.5 to 20 wt. % molybdenum based on the weight of said dispersant.

4,176,074

MOLYBDENUM COMPLEXES OF ASHLESS OXAZOLINE DISPERSANTS AS FRICTION REDUCING ANTIWEAR ADDITIVES FOR LUBRICATING OILS

Keith Coupland; Juan M. Salva, both of Sarnia, and Clinton R. Smith, Camlachie, all of Canada, assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Sep. 18, 1978, Ser. No. 943,342

Int. Cl.[2] C10M *1/48, 1/54;* **C10L** *1/30;* **C07F** *11/00*

U.S. Cl. 252—32.7 E **17 Claims**

1. An oil-soluble molybdenum complex of an ashless oxazoline dispersant having from 0.5 to 20 wt.% molybdenum based on the weight of said dispersant.

4,176,075

DIOXIME AND HYDROXY BENZOIC ACID METAL SALT ANTIOXIDANTS FOR LITHIUM SOAP GREASE COMPOSITIONS

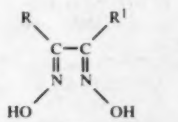
A. Gordon Alexander, and Keith Coupland, both of Sarnia, Canada, assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Sep. 13, 1978, Ser. No. 941,859

Int. Cl.[2] C10M *5/20, 7/32, 7/30, 5/14*

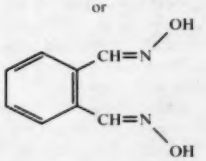
U.S. Cl. 252—42.1 **14 Claims**

1. A lubricating grease composition which comprises a major proportion of lubricating oil, from about 2 to about 30 weight percent of a thickener system containing a lithium soap of a C_{12} to C_{24} hydroxy fatty acid and an antioxidant system which comprises from about 0.01 to about 10 weight percent of an alkali metal salt of hydroxy benzoic acid and from about 0.01 to about 10 weight percent of a dioxime compound having the general formula:



(I)

or



(II)

where R and R′ represent independently selected alkyl groups of 1 to 12 carbon atoms, and alkali metal salts of (I) and (II).

4,176,076

MONOALKANOLAMIDE BORATES, COMPOSITIONS CONTAINING THE SAME, AND THE USE THEREOF AS RUST-INHIBITORS AND AS SYNERGISTIC LUBRICATIVE-ENHANCIVE ADDENDA

David A. Waldstein, 622 Bergen Ave., Jersey City, N.J. 07304

Continuation-in-part of Ser. No. 674,322, Apr. 7, 1976, abandoned, which is a division of Ser. No. 450,565, Mar. 13, 1974, Pat. No. 3,969,236. This application Nov. 10, 1977, Ser. No. 850,132

The portion of the term of this patent subsequent to Jul. 13, 1993, has been disclaimed.

Int. Cl.[2] C10M *1/10*

U.S. Cl. 252—49.6 **1 Claim**

1. A composition comprising a liquid carrier constituting a hydraulic fluid base on mineral oils, water-in-oil emulsions, oil-in-water emulsions, and synthetic lubricating oil and a rust-inhibiting-effective amount of the reaction product of orthoboric acid and a primary alkanolamine selected from the group consisting of monoethanolamine, monomethanolamine, 1-isopropanolamine, mono-n-propanolamine and 2-amino-2-methylpropanolamine in a ratio of 1 gram mole of boric acid to 1 to 2 gram moles of alkanolamine, the reaction taking place in a closed reactor for about 4 to 5 hours at a temperature between about 130° C. to about 165° C. with the water formed being removed during the reaction.

4,176,077

HALOALKYL HYDROXY-AROMATIC CONDENSATION PRODUCTS AS LUBRICANT ADDITIVES

David E. Ripple, Kirtland, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

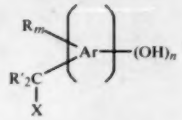
Division of Ser. No. 684,818, May 10, 1976, Pat. No. 4,108,783, which is a continuation-in-part of Ser. No. 459,424, Apr. 9, 1974, abandoned. This application Apr. 28, 1978, Ser. No. 901,174

Int. Cl.[2] C10M *1/32*

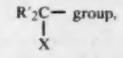
U.S. Cl. 252—51.5 R **16 Claims**

1. A lubricant composition comprising a major amount of at least one lubricating oil and a minor, but engine sludge dispersing, amount of a product made by the process comprising reacting at a temperature ranging from about 100° C. to about 300° C.

(A) at least one alpha haloalkyl hydroxy aromatic compound of the general formula



wherein Ar is a hydrocarbyl aromatic nucleus of 6 to about 30 carbon atoms, said aromatic nucleus substituted with one or more up to 3 each of lower alkoxy, lower alkylthio, chloro, or nitro substituents, each R is a nonfused hydrocarbyl group of about 25 to about 700 carbon atoms, X is a halogen atom, each R′ is independently a hydrogen atom, an alkyl group of 1 to 36 carbon atoms, or a halogen-substituted alkyl group of 1 to about 36 carbon atoms, n is 1 to 3 and m is 1 to 5 with the provisos that (i) the total number of carbon atoms in both the R′ groups does not exceed 36 and (ii) where m exceeds 1, one of the R groups can also be a



with

(B) at least one alpha-beta olefinically unsaturated compound selected from the group consisting of $C_{2\text{-}40}$ hydrocarbyl nitriles, and ammonium and metal salts of said

C_{2-40} carboxylic acids; the ratio of (A) to (B) is between about 0.5:1 to about 2:1, and the reaction of (A) with (B) resulting in the formation of a carbon-to-carbon bond, said bond including the carbon of at least one

group.

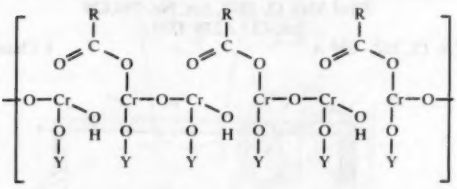
4,176,078

FIELD DEPENDENT TONER HAVING CHROME COMPLEX COATED MAGNETIC PARTICLES

Chin H. Lu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 2, 1977, Ser. No. 802,770
Int. Cl.[2] G03G 9/14
U.S. Cl. 430—109 **4 Claims**

1. A field dependent toner comprising a resin coated magnetic particles wherein the surface of said particles is represented by the formula



wherein R represents a fatty acid radical of between 7 and 17 carbon atoms and Y represents negative polar surface groups of the magnetic particles, said toner having a resistivity greater than about 10^{12} ohm-cm at fields up to about 100 volts/cm.

4,176,079

WATER-SOLUBLE ENZYME-CONTAINING ARTICLE

Raymond E. Guerry, Forest Park, and David D. Whyte, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 20, 1977, Ser. No. 789,323
Int. Cl.[2] C11D 17/06
U.S. Cl. 252—90 **27 Claims**

1. A granular detergent composition comprising from about 1% to about 40% of a surface-active agent selected from the group consisting of water-soluble anionic, nonionic, ampholytic and zwitterionic surface-active agents and mixtures thereof and from about 10% to about 60% of a detergent builder selected from the group consisting of sodium and potassium polyphosphates, carbonates, bicarbonates, silicates, polyacetates, carboxylates, polycarboxylates and polyhydroxysulfonates and containing a nondusting article, said article comprising an enzyme selected from the group consisting of proteolytic enzymes, amylolytic enzymes and mixtures thereof dispersed in a water-soluble resin film, said resin selected from the group consisting of polyvinyl alcohol, cellulose ethers, polyethylene oxide, starch, polyvinylpyrrolidone, polyacrylamide, polyvinylmethylethermaleic anhydride, polymaleic anhydride, polystyrene-maleic anhydride and mixtures thereof, wherein one dimension of said article is at least about 20 millimeters in size and the thickness of said article is not more than about 50 mils.

4,176,080

DETERGENT COMPOSITIONS FOR EFFECTIVE OILY SOIL REMOVAL

Rodney M. Wise, and Sharon J. Mitchell, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 3, 1977, Ser. No. 839,221
Int. Cl.[2] C11D 7/24
U.S. Cl. 252—162 **14 Claims**

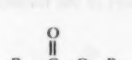
1. A cleaning product composition for removing oily soil from fabrics in an aqueous washing medium consisting essentially of:

(1) a discrete unit of an oily soil dissolving agent consisting essentially of:

(a) from about 20% to about 97% by weight of a water-insoluble solvent selected from the group consisting of:

(i) alkanes and alkenes having a flash point not lower than about 65° C. (Tag closed cup), an initial boiling point not lower than about 130° C., a solidification point not above about 20° C. and a carbon chain length from about 10 to about 18; **and**

(ii) fatty acid esters of the formula



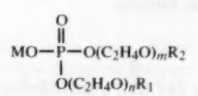
in which R_1 is an alkyl group with from about 7 to about 17 carbon atoms and R_2 is an alkyl group with from 1 to about 10 carbon atoms, the sum of carbon atoms in R_1 and R_2 being from about 8 to about 23;

(b) from about 3% to about 30% by weight of a water-in-oil emulsifier soluble in said solvent, said emulsifier having an HLB value of from about 2 to about 12 and consisting essentially of from about 25% to 100% of emulsifier compounds with at least two alkyl groups each having from about 9 to about 20 carbon atoms and selected from the group consisting of:

(i) dialkyl sulfosuccinic acid and alkali metal, alkaline earth metal, ammonium, and mono-, di-, and tri-C_{1-4} alkyl and alkanol ammonium salts of dialkyl sulfosuccinic acid, said alkyl groups each containing from about 9 to about 20 carbon atoms;

(ii) quaternary ammonium compounds with more than one long chain alkyl group selected from the group consisting of di-C_{9-20} alkyl ammonium chloride, bromide, methyl sulfate, nitrate and acetate and di-C_{9-20} alkyl imadazolinium quaternary ammonium compounds;

(iii) alkyl or alkyl ethoxy diesters of phosphoric acid having the formula



in which both R_1 and R_2 are alkyl groups containing from about 9 to about 20 carbon atoms, n and m are from zero to about 8 and M is hydrogen or a salt forming cation, and

(iv) mixtures thereof;

(c) from 0% to about 77% water; and

(d) from 0% to about 77% detergency builders selected from the group consisting of water soluble orthophosphates, polyphosphates, phosphonates, carbonates, bicarbonates, polyhydroxysulfonates, silicates, carboxylates and polycarboxylates, water-insoluble aluminosilicates and mixtures thereof,

(2) a discrete unit or units of a solvent stripping agent consisting essentially of from about 5% to 100% of a water-soluble surfactant having an HLB value of from about 11 to about 18, selected from the group consisting of anionic,

nonionic, zwitterionic, amphoteric and cationic surfactants and mixtures thereof, from 0% to about 95% water and from 0% to about 95% detergency builders selected from the group consisting of water soluble orthophosphates, polyphosphates, phosphonates, carbonates, bicarbonates, polyhydroxysulfonates, silicates, carboxylates and polycarboxylates, water-insoluble aluminosilicates and mixtures thereof, said discrete unit comprising from about 10% to about 80% by weight of the total cleaning product.

9. A method of removing oily soil from fabrics consisting essentially of:

(1) contacting said fabrics with an aqueous washing medium consisting essentially of:

(a) from about 0.01% to about 3% by weight of a water-insoluble solvent selected from the group consisting of:

(i) alkanes and alkenes having a flash point not lower than about 65° C. (Tag closed cup), an initial boiling point not lower than about 130° C., a solidification point not above about 20° C. and a carbon chain length from about 10 to about 18; and

(ii) fatty acid esters of the formula

$$R_1-\overset{\overset{O}{\|}}{C}-O-R_2,$$

in which R_1 is an alkyl group with from about 7 to about 17 carbon atoms and R_2 is an alkyl group with from 1 to about 10 carbon atoms, the sum of carbon atoms in R_1 and R_2 being from about 8 to about 23;

(b) from about 0.01% to about 0.5% by weight of a water-in-oil emulsifier soluble in said water-insoluble solvent having an HLB value of from about 2 to about 12 and consisting essentially of from about 25% to 100% of emulsifier compounds with at least two alkyl groups each having from about 9 carbon atoms to about 20 carbon atoms and selected from the group consisting of:

(i) dialkyl sulfosuccinic acid and alkali metal, alkaline earth metal, ammonium, and mono-, di-, and tri-C_{1-4} alkyl and alkanol ammonium salts of dialkyl sulfosuccinic acid, said alkyl groups each containing from about 9 to about 20 carbon atoms;

(ii) quaternary ammonium compounds with more than one long chain alkyl group selected from the group consisting of di-C_{9-20} alkyl ammonium chloride, bromide, methyl sulfate, nitrate and acetate and di-C_{9-20} alkyl imadazolinium quaternary ammonium compounds;

(iii) alkyl or alkyl ethoxy diesters of phosphoric acid having the formula

$$MO-\overset{\overset{O}{\|}}{\underset{\underset{O(C_2H_4O)_nR_1}{|}}{P}}-O(C_2H_4O)_mR_2$$

in which Both R_1 and R_2 are alkyl groups containing from about 9 to about 20 carbon atoms, n and m are from zero to about 8 and M is hydrogen or a salt forming cation, and

(iv) mixtures thereof; and

(c) from about 90% to about 99.6% water;

(2) allowing said fabrics to remain in contact with said washing medium for at least 30 seconds; and

(3) adding or releasing to said aqueous medium containing said fabric from about 0.01% to about 1% by weight of a water-soluble surfactant having an HLB value of from about 11 to about 18, selected from the group consisting of anionic, nonionic, zwitterionic, amphoteric and cationic surfactants and mixtures thereof.

4,176,081

SOLUTIONS OF ACRYLAMIDOALKANESULFONIC ACID SALTS IN ORGANIC LIQUIDS AND METHOD FOR THEIR PREPARATION

Donald L. Surbey, Lyndhurst; Alan C. Clark, Mentor, and Leonard E. Miller, Chagrin Falls, all of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Continuation-in-part of Ser. No. 816,117, Jul. 15, 1977, abandoned. This application Feb. 15, 1978, Ser. No. 877,940

Int. Cl.[2] **C07C** *143/14;* **C08F** *220/46;* **C08K** *5/42*

U.S. Cl. 252—182 **20 Claims**

1. A method for preparing a solution in a polar organic liquid of a metal salt of at least one acrylamidoalkanesulfonic acid which comprises reacting said acrylamidoalkanesulfonic acid in said liquid with at least a stoichiometric amount of at least one metal base selected from the group consisting of metal salts of weak acids and cation exchange resins in the metal salt form in the presence of an inhibitor of free radical polymerization and at a temperature below the temperature of polymerization, said reaction being continued until the neutralization number of the solution to phenolphthalein is a base number or, if an acid number, is no higher than about 1.0.

4,176,082

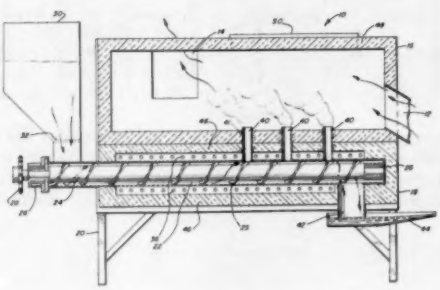
CLOSED SMOKE GENERATING APPARATUS

Clarence W. West, 208 S. La Salle St., Chicago, Ill. 60604

Filed May 13, 1977, Ser. No. 796,629

Int. Cl.[2] **A23B** *4/04*

U.S. Cl. 252—359 A **6 Claims**



1. A closed smoke generating apparatus isolated from the atmosphere for destructive distillation of particulate materials, comprising:

(a) a pair of elongated housings arranged one above the other, closely adjacent and substantially parallel;

(b) conduit means interconnecting said housings to provide at least one smoke passageway from the lower housing directly into the upper housing;

(c) means for continuously feeding organic particulate materials into one end of the lower housing without leakage of air into or out of said one end of said lower housing, including

(i) a feed device arranged to continuously supply said particulate materials to said one end of said lower housing,

(ii) a rotatable elongated feed auger mounted in said lower housing for advancing said materials from said one end toward the other end of said lower housing, and

(iii) means for rotating said auger;

(d) means providing a source of heat surrounding a portion of said lower housing downstream of said one end for generating smoke by destructive distillation of said particulate materials;

(e) means connected to said other end of said lower housing for discharging residual matter from said lower housing without leakage of air into or out of said other end;

(f) the upper housing comprising a smoke collection chamber, including

(i) inlet means adapted to receive a supply of carrier gas, and

(ii) outlet means spaced from said inlet means and adapted to discharge smoke mixed with said carrier gas from said upper housing.

4,176,083

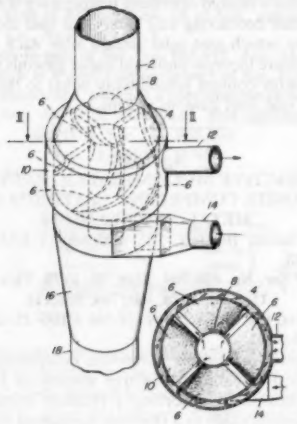
SEPARATING FLUE GAS FROM REGENERATED CRACKING CATALYST

Stephen J. McGovern, Deptford; Klaus W. Schatz, Wenonah, and Zrinscak, Sr. Fred S., Woodbury Heights, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 25, 1978, Ser. No. 937,035

Int. Cl.[2] **B01J** *21/20, 29/38;* **C10G** *13/18;* **B04C** *3/06*

U.S. Cl. 252—411 R **6 Claims**



1. In a process for stripping hot regenerated catalyst with a fuel gas before passage to a hydrocarbon conversion operation, the improved method of stripping which comprises,

passing hot regenerated catalyst with entrained CO_2 containing flue gas downwardly as a confined stream into a zone imparting a centrifugal annular catalyst flow to said downwardly flowing confined stream about a centrally positioned zone closed at its upper end but open in the bottom end thereof,

contacting said annular flowing catalyst stream with fuel gas and displacing CO_2 from the catalyst,

withdrawing fuel gas with displaced CO_2 into said centrally postioned zone for withdrawal from the stripping operation, and

withdrawing regenerated catalyst displaced from CO_2 from beneath said centrally positioned zone for transfer to a hydrocarbon conversion zone.

2. The method of claim **1** wherein the fuel gas has been separated from hydrogen sulfide before displacing said flue gas.

4,176,084

PROCESS FOR REGENERATING METAL-CONTAMINATED HYDROCARBON CONVERSION CATALYSTS

Edward C. Luckenbach, Mountainside, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

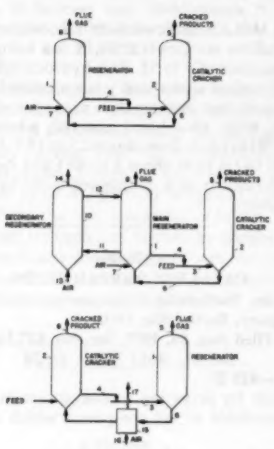
Continuation of Ser. No. 594,121, Jul. 8, 1975, abandoned. This application Nov. 11, 1977, Ser. No. 850,716

Int. Cl.[2] **B01J** *21/20, 29/38;* **C10G** *11/04, 11/18*

U.S. Cl. 252—417 **8 Claims**

1. In a hydrocarbon conversion process whereby a metal contaminated hydrocarbon feed containing more than 10 PPM of nickel and vanadium is contacted in a conversion zone with a hydrocarbon conversion catalyst to produce lower boiling hydrocarbon products and a spent catalyst having coke and said metal contaminant deposited thereon and wherein said spent catalyst is reactivated in a fluid bed regeneration zone operated at elevated temperatures in the presence of oxygen at a concentration level which is insufficient to completely combust said coke on the catalyst to CO_2 thereby producing a regenerated catalyst and a flue gas containing more than 2 volume % CO, the improvement which comprises periodically operating said fluid bed regeneration zone at conditions of excess oxygen and at a temperature in excess of 1300° F. so that the level of oxygen therein is for a period ranging from 1 to 20% of the time said fluid bed regenerator is in operation in excess of the amount required to completely burn said deposited coke to CO_2, thereby reducing the poisoning effect of the deposited metals present on the regenerated catalyst.

5. In a hydrocarbon conversion process whereby a metal contaminated hydrocarbon feed containing more than 10 PPM of nickel and vanadium is contacted in a conversion zone with a hydrocarbon conversion catalyst to produce lower boiling



hydrocarbon products and a spent catalyst having coke and said metal contaminants deposited thereon, and wherein said spent catalyst is reactivated in a fluid bed main regeneration zone operated at elevated temperatures in the presence of oxygen at a concentration level which is insufficient to completely combust said coke on the catalyst to CO_2, thereby producing a partially regenerated catalyst and a flue gas containing more than 2 volume % CO, the improvement which comprises circulating a portion of said partially regenerated catalyst between said main regeneration zone and a secondary regeneration zone segregated from said main regeneration zone, said secondary regeneration zone being maintained at a temperature in excess of 1300° F. and containing oxygen in an amount which is in excess of that required to completely combust the coke remaining on said partially regenerated catalyst to CO_2 such that the flue gas from said secondary regeneration zone will contain oxygen, thereby producing a regenerated catalyst from which the poisoning effect of the deposited metals on the catalyst has been reduced.

4,176,085
PALLADIUM-CONTAINING CATALYST

Jin S. Yoo, South Holland, Ill., and Ronald L. Milam, Media, Pa., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 320,164, Jan. 2, 1973, Pat. No. 3,920,763, and a continuation of Ser. No. 53,654, Jul. 9, 1970, abandoned. This application Jun. 9, 1975, Ser. No. 585,227

Int. Cl.[2] **B01J** *31/22*

U.S. Cl. 252—428 **11 Claims**

1. A catalyst composition which comprises a minor amount of a π-allyl complex of:

(A) a palladium source capable of forming a π-allyl complex,

(B) a monotertiary phosphine electron donor ligand represented by the structural formula:

$$(R)_3P$$

wherein R is hydrocarbyl having from 1 to about 20 carbon atoms,

(C) combination of reducing agent capable of reducing the palladium to an oxidation state of less than 2 and Lewis acid capable of forming a coordination bond with palladium represented by the structural formula:

$$R'_{(n-y)}MX_y,$$

wherein M is a metallic element of coordination number n whose halides are Lewis acids, X is a halogen having an atomic number of 9 to 53, R′ is hydrocarbyl having up to about 20 carbon atoms, and y is a number having a value from 1 to at least one less than n, supported on

(D) acidic, solid, silica-based material; wherein the molar ratio of (B) to (A) is from about 0.5 to 15:1, the molar ratio of (C) to (A) is from about 2 to 40:1 and the π-allyl complex is formed from a conjugated diene having up to 10 carbon atoms.

4,176,086
CATALYST PREPARATION

Cecil O. Carter, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 25, 1977, Ser. No. 827,519

Int. Cl.[2] **B01J** *31/22, 31/24*

U.S. Cl. 252—429 B **9 Claims**

1. A process for preparing a catalyst system comprising a hydrocarbon-soluble nickel compound which comprises the steps of:

(a) reacting a hydrate of a nickel compound with an organic complexing agent in a hydrocarbon solvent under conditions to form a complex of said nickel compound and said complexing agent which also contains water of hydration,

(b) allowing the complex formed in (a) to settle and separate into a water phase and a hydrocarbon solution of the complex, and

(c) drying said hydrocarbon solution of complex separated in (b) by subjecting same to azeotropic distillation under temperature and pressure conditions sufficient to remove entrained water overhead along with hydrocarbon solvent and as bottoms substantially anhydrous hydrocarbon solution of complex.

4,176,087
METHOD FOR ACTIVATING A HYDRODESULFURIZATION CATALYST

John N. Dew; Michael W. Britton; Eugene A. Harlacher, all of Ponca City, Okla., and Joseph A. Kleinpeter, McMurray, Pa., assignors to Conoco Methanation Company, Stamford, Conn.

Filed Jun. 20, 1977, Ser. No. 808,013

Int. Cl.[2] **B01J** *27/02*

U.S. Cl. 252—439 **6 Claims**

1. A method for sulfiding a hydrodesulfurization catalyst useful in reacting a sulfur-containing synthesis gas stream containing carbon oxides and hydrogen, said catalyst consisting essentially of at least one member selected from the group consisting of nickel, nickel compounds, cobalt, cobalt compounds, molybdenum and molybdenum compounds supported on a catalyst carrier material comprising at least one of the group consisting of aluminum oxides, silica, kaolin, and kieselguhr, said method consisting essentially of sequentially

(a) passing an inlet gaseous stream comprising carbon oxides, H_2 and at least one sulfur-containing compound selected from the group consisting of H_2S, COS, C_2S, mercaptans and thiophenes, into contact with said catalyst at a temperature from about 400° to about 700° F. and a space velocity greater than about 500 hr^{-1} until the outlet gaseous stream has a sulfur content substantially equal to the sulfur content of said inlet gaseous stream;

(b) increasing the temperature in said catalyst bed incrementally, until a desired operating temperature is reached; and

(c) further contacting said catalyst at said increased temperature which said inlet stream after each incremental temperature increase until said outlet gaseous stream again has a sulfur content substantially equal to the sulfur content of said inlet gaseous stream.

4,176,088
SUPERACTIVE MULTIMETALLIC CATALYTIC COMPOSITE COMPRISING PLATINUM GROUP METAL AND RHENIUM

George J. Antos, Bartlett, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 888,708, Mar. 20, 1978. This application Oct. 30, 1978, Ser. No. 956,111

Int. Cl.[2] **B01J** *23/64, 21/04;* **C10G** *35/08*

U.S. Cl. 252—441 **15 Claims**

1. A bimetallic catalytic composite comprising a reduced combination of a cataytic effective amount of rhenium and platinum prepared by adsorbing a rhenium compound comprising a rhenium oxide or a rhenium compound convertible to the oxide form on a porous carrier which has a uniform dispersal of said catalytically effective amount of platinum, wherein said platinum is maintained in the elemental metallic state, at least a portion of said rhenium compound is adsorbed on the surface of said elemental metallic platinum and wherein said rhenium compound is reduced in a substantially water-free atmosphere consisting essentially of a hydrogen-containing inert gas to the elemental metallic rhenium metal at reduction conditions during which said platinum group component is maintained in said elemental metallic state.

2. A bimetallic catalytic composite as defined in claim 1 wherein the porous carrier material contains a catalytically effective amount of a halogen component.

4,176,089
PROCESS FOR THE PREPARATION OF SILICA-TITANIA AND CATALYSTS COMPRISING THE SAME

Neville L. Cull, Baker, La., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Aug. 3, 1978, Ser. No. 930,573

Int. Cl.[2] **B01J** *37/02, 29/00*

U.S. Cl. 252—452 **37 Claims**

1. A process for the preparation of a silica-titania composition which comprises the steps of:

(a) mixing a silicon alkoxide, titanium alkoxide and an organic diluent, and

(b) adding the resulting mixed alkoxides mixture to a hydrolysis mixture comprising water and an organic solvent to hydrolyze said mixed alkoxides and form a silica-titania precipitate.

2. The process of claim 1 wherein said silica-titania composition has a surface area ranging from about 100 to about 400 m^2/g and a bulk density ranging from about 0.2 to about 0.60 g/cc.

19. A process for the preparation of a catalyst which comprises compositing a metal or a compound of a metal selected from the group consisting of Groups IB, IIA, IIB, IVA, IVB, VIB, VIIB and VIII and mixtures thereof and a silica-titania composition prepared by steps which comprise:

(a) mixing a silicon alkoxide, a titanium alkoxide and an organic diluent, and

(b) adding the resulting mixed alkoxides mixture to a hydrolysis mixture comprising water and an organic solvent to hydrolyze said mixed alkoxides and to form a silica-titania precipitate.

4,176,090

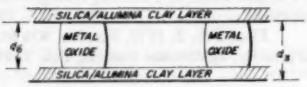
PILLARED INTERLAYERED CLAY MATERIALS USEFUL AS CATALYSTS AND SORBENTS

David E. W. Vaughan, Columbia; Roger J. Lussier, and John S. Magee, Jr., both of Ellicott City, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 805,672, Jun. 13, 1977, abandoned, which is a continuation-in-part of Ser. No. 704,358, Jul. 12, 1976, abandoned, which is a continuation-in-part of Ser. No. 633,053, Nov. 18, 1975, abandoned. This application Mar. 10, 1978, Ser. No. 885,408

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z 21 Claims



1. An interlayered smectite clay product which includes an inorganic oxide selected from the group consisting of alumina, zirconia and mixtures thereof between the layers thereof, and which possesses an interlayer distance of from about 6 to 16 Å, said interlayered clay having greater than about 50 percent of its surface area in pores of less than 30 Å in diameter.

8. A process for preparing an interlayered smectite which comprises:

(a) reacting a smectite with a mixture of a polymeric cationic hydroxy inorganic metal complex selected from the group comprising aluminum and zirconium complexes and mixtures thereof and water to obtain a smectite having greater than 50 percent of its surface area in pores of less than 30 Å in diameter after dehydration; and

(b) separating the interlayered smectite from the mixture.

19. A hydrocarbon conversion catalyst comprising the interlayered clay of claim 1, admixed with a crystalline aluminosilicate zeolite which comprises a member selected from the group consisting of inorganic oxides and a matrix clay, and mixtures thereof.

4,176,091

DENITRATING CATALYSTS HAVING POROUS COATING AND PROCESS FOR PRODUCING SAME

Hideya Inaba; Hisao Ogiyama; Masayoshi Ichiki; Yasumi Kamino; Nobuo Matsumoto; Kenichi Nagai, and Masami Suzuki, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Jul. 24, 1978, Ser. No. 927,096

Int. Cl.[2] B01J *21/08, 23/26, 23/22, 23/72*

U.S. Cl. 252—456 20 Claims

1. A process for producing a denitrating catalyst comprising the step of forming a carrier having a porous silica coating by immersing a catalyst base of porous metal in a silica-containing coating bath and drying the base, and the step of causing the carrier to support an active component thereon by immersing the carrier in a solution containing the active component and drying the resulting carrier.

4,176,092

PROCESS FOR THE DEPYROPHORIZATION OF PYROPHORIC METAL CATALYSTS AND CATALYSTS PREPARED BY THE PROCESS

Udo Birkenstock, Ratingen, and Josef Haydn, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 13, 1977, Ser. No. 806,238

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1977, 2713373

Int. Cl.[2] B01J *25/02*

U.S. Cl. 252—472 23 Claims

1. A non-pyrophoric, highly active metal catalyst, requiring essentially no pre-activation, and prepared from a pyrophoric metal catalyst by treating a suspension of the pyrophoric metal catalyst in water and/or an organic solvent with an organic nitro compound or a nitroso compound.

4,176,093

NEUTRON ABSORBING ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER COMPOSITIONS

Harold L. Zoch, 55 Scribner Ave., Middleburgh, N.Y. 12122

Filed Feb. 22, 1977, Ser. No. 770,331

Int. Cl.[2] G21F *1/10*

U.S. Cl. 252—478 20 Claims

1. A neutron absorbing one component room temperature vulcanizable silicone rubber composition comprising (a) 100 parts by weight of a silanol-terminated diorganopolysiloxane having a viscosity varying from 100 to 500,000 centipoise at 25° C., where the organo groups are monovalent hydrocarbon radicals; (b) from 25 to 300 parts by weight of a neutron absorber selected from the class consisting of boron compounds and boron powder; (c) from 1 to 15 parts by weight of a silane or siloxane having functionality selected from the class consisting of alkoxy functionality and acetoxy functionality and; (d) from 0.01 to 5 parts by weight of a catalyst.

4,176,094

METHOD OF MAKING STOICHIOMETRIC LEAD AND BISMUTH PYROCHLORE COMPOUNDS USING AN ALKALINE MEDIUM

Harold S. Horowitz, Clark; John M. Longo, New Providence, and Joseph T. Lewandowski, Middlesex, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 856,648, Dec. 2, 1977, Pat. No. 4,129,525. This application Aug. 31, 1978, Ser. No. 938,374

Int. Cl.[2] H01B *1/08*

U.S. Cl. 252—518 27 Claims

1. A method of preparing compounds having the formula:

$$A_2B_2O_{7-y}$$

wherein A is selected from the group consisting of lead, bismuth and mixtures thereof, wherein B is selected from the group consisting of ruthenium, iridium and mixtures thereof, wherein y is a value such that $O \leqq y \leqq 1$, comprising:

reacting A cations and B cations, in approximately stoichiometric amounts, from an aqueous solution source of these cations in a liquid alkaline medium having a pH of at least about 13.5 in the presence of an oxygen source at a temperature below about 200° C. for a sufficient time for reaction to occur.

4,176,095

REINFORCED XYLENE-FORMALDEHYDE RESIN COMPOSITIONS

Walid Y. Aziz, Warrensville, and Lawrence E. Ball, Cuyahoga Falls, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Filed Jul. 19, 1978, Ser. No. 925,914
Int. Cl.[2] C08L *1/02, 5/00*
U.S. Cl. 260—9 **7 Claims**

1. The composition comprising a blend of a thermoplastic xylene-formaldehyde polymer and a reinforcing agent wherein the xylene-formaldehyde polymer is one having a softening point of at least 120° C. and containing less than 2% oxygen by weight and having a molecular weight greater than 20,000 and wherein the reinforcing agent is at least one member selected from the group consisting of carbon fibers, cotton flock, wood flour, granulated cork, mica and glass fibers.

4,176,096

PREDISPERSED COMPOSITION FOR USE IN THERMOSETTING ACRYLIC AUTOMOTIVE FINISHES

George Patterson, Philadelphia; Edgar N. Putman, New Hope, and John B. McCool, III, Ottsville, all of Pa., assignors to PFD/Penn Color, Inc., Doylestown, Pa.

Continuation of Ser. No. 707,489, Jul. 22, 1976, abandoned. This application Mar. 13, 1978, Ser. No. 885,529
Int. Cl.[2] C08L *1/14*
U.S. Cl. 260—15 **16 Claims**

1. A method of making a durable automotive spray-paint, comprising the steps of:

(a) predispersing a pigment into a dispersant composition consisting essentially of 30–70 weight percent aryl sulfonamide formaldehyde resin and 30–70 weight percent cellulose acetate butyrate to produce a dry, predispersed composition containing 60–85 weight percent of said pigment;

(b) dissolving said predispersed composition in a preselected amount of solvent solution to produce a liquid predispersed composition; and

(c) mixing said liquid predispersed composition with a preselected amount of thermosetting acrylic resin to produce an automotive paint containing between 15 and 22 weight percent of said pigment, said preselected amount of solvent solution being selected to produce a paint of a sprayable viscosity.

4,176,097

ASBESTOS-FREE TAPE SEALANT

Roy A. Fox, Medford, N.J., and Bradford T. Mortimer, Wheaton, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 25, 1978, Ser. No. 899,720
Int. Cl.[2] C08L *1/02*
U.S. Cl. 260—17.4 BB **15 Claims**

1. A sealant composition comprising the following components:

Component	Approximate wt. % Range
cotton fiber (up to 0.25 inch)	2–20
amorphous polypropylene (200–1800 centipoises)	1–10
butyl rubber (Mooney vicosity 40–65)	0.5–25
inorganic filler	30–80
polybutene (200–1000 centipoises)	15–40
polyisobutlylene (molec. wt. 20,000–50,000)	0–40

4,176,098

ARC RESISTANT COMPOSITION

Donald G. Needham, Ramona, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 837,651, Sep. 30, 1977, abandoned, which is a continuation-in-part of Ser. No. 701,728, Jul. 1, 1976, abandoned. This application Jun. 12, 1978, Ser. No. 914,837
Int. Cl.[2] C08L *81/04*
U.S. Cl. 260—18 R **20 Claims**

1. An arc resistant composition which comprises:

a poly(arylene sulfide);

about 20 to about 50 weight percent of the total composition of at least one additive chosen from among clay and talc; and

about 1 to about 5 percent by weight of the total composition of lithium carbonate.

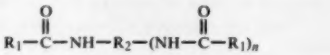
4,176,099

SELF-CROSSLINKING CATIONIC RESIN EMULSIONS FOR USE IN ELECTRODEPOSITION PAINTS

Georgios Pampouchidis, and Helmut Hönig, both of Graz, Austria, assignors to Vianova Kunstharz, A.G., Vienna, Austria

Filed Feb. 2, 1978, Ser. No. 874,562
Claims priority, application Austria, Feb. 7, 1977, 756/77
Int. Cl.[2] C08L *33/21*
U.S. Cl. 260—18 TN **14 Claims**

1. Emulsions of binders which are cathodically depositable in an electrodeposition system comprising (A) 10 to 99.9 percent by weight of at least one self-crosslinking polymeric resin, and (B) 0.1 to 90 percent by weight of at least one basic urethane compound having the formula



wherein n is an integer of 1, 2, or 3; R is an aromatic, cycloaliphatic, or aliphatic hydrocarbon radical; R_1 is the moiety of a dialkylalkanolamine remaining after reaction with an isocyanate, and R_2 is the moiety of at least one member of the group consisting of monohydroxyalkyl(meth)acrylate, monohydroxyalkoxy(meth)acrylate, and a monohydroxyallylether of a polyol after reaction with an isocyanate; the components (A) and (B) being selected to provide an emulsion having a basicity corresponding to at least 0.5 and a double bond number of at least 0.5.

4,176,100

TEXTURED SURFACE COATING

Nathan R. Rider, Sparta, Mich., assignor to Kay Tex Products, Inc., Grand Rapids, Mich.

Filed Oct. 3, 1978, Ser. No. 948,291
Int. Cl.[2] C08L *91/00*
U.S. Cl. 260—22 R **22 Claims**

1. A textured surface coating composition based on polyvinyl acetate and mineral fillers, the improvement in said composition comprising: said mineral fillers including from about 5 to about 10% by weight acicular zinc oxide; said composition having an overall pigment volume concentration of from about 49% to about 53%.

4,176,101

MELT STRENGTH IMPROVEMENT OF PET

John P. Leslie, Levittown; Constance A. Lane, Philadelphia, and R. Peter Grant, Newtown, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 830,240, Sep. 2, 1977, Pat. No. 4,145,466. This application Aug. 21, 1978, Ser. No. 935,226

Int. Cl.[2] C08G *63/76;* C08K *5/09, 5/20*

U.S. Cl. 260—22 T 7 Claims

3. A composition for thermoplastic processing to form amorphous articles comprising PET (A) a polyanhydride selected from the group consisting of pyromellitic dianhydride, mellitic trianhydride, tetrahydrofuran dianhydride, and polyanhydride containing at least two unsubstituted or substituted phthalic anhydride radicals, and (B) a fatty acid or N-substituted fatty acid amide having at least 10 carbon atoms in the acid portion of the molecule, said composition being free of crystallization promoter.

4,176,102

SEALANT COMPOSITION

Theodore Favata, 3196 Ramona St., Pinole, Calif. 94564

Filed Oct. 2, 1978, Ser. No. 947,957

Int. Cl.[2] C08L *91/00*

U.S. Cl. 260—28.5 AS 16 Claims

1. A sealant composition comprising:

A. approximately 50 to 80 parts by volume asphaltic emulsion;

B. approximately 20 to 50 parts by volume of a copolymer prepared by the copolymerization of a vinyl acetate monomer with an organic acid; and

C. approximately 0.5 to 2.0 parts by volume of a nonionic surfactant having a hydrolyptic balance from approximately 11 to 14.

4,176,103

POLYMER LATICES

John M. Cruden; Alan J. Bignold, both of Harlow; Roger H. Green, Chelmsford, and Ronald J. Grisenthwaite, Harlow, all of England, assignors to Harlow Chemical Company Limited, Harlow, England

Filed Nov. 5, 1973, Ser. No. 412,967

Claims priority, application United Kingdom, Nov. 16, 1972, 53001/72; Jul. 9, 1973, 32517/73

Int. Cl.[2] C08L *29/00*

U.S. Cl. 260—29.6 RW 17 Claims

1. A polymer latex composition comprising a polymer latex containing at least one component which contains a group which has hydrazone or azine linkages produced by the reaction of a keto or aldehydo carbonyl group on the polymer and a hydrazine in an amount sufficient to improve the wet adhesion properties of the polymer latex composition.

4,176,104

POLYSTYRENE PHONOGRAPH RECORD INJECTION MOLDING COMPOSITIONS OF IMPROVED TRANSPARENCY

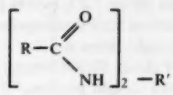
Henry Alsberg, Northbrook; Dale Skalla, Cicero, and William C. Meisenhelder, Downers Grove, all of Ill., assignors to The Richardson Company, Des Plaines, Ill.

Filed Jul. 7, 1978, Ser. No. 922,794

Int. Cl.[2] C08L *25/06;* C08F *2/44*

U.S. Cl. 260—28.5 R 22 Claims

1. A phonograph record injection molding composition comprising a modified styrene polymer composition, said modified styrene polymer being a polymerization product of styrene polymerized with a lubricity-enhancing modifier dissolved therewithin, said lubricity-enhancing modifier having the following structure:



wherein R is alkyl having from about 14 to about 19 carbon atoms and R′ is alkane having from about 2 to about 5 carbon atoms, said modified styrene polymer being a polystyrene matrix having said lubricity-enhancing modifier generally molecularly distributed within and throughout said matrix, and said modified styrene polymer being a substantially transparent phonograph record injection molding composition.

4,176,105

HIGH TEMPERATURE MINERAL FIBER BINDER

Patrick M. Miedaner, Parkville, Mo., assignor to Certain-Teed Corporation, Valley Forge, Pa.

Filed Sep. 6, 1977, Ser. No. 830,590

Int. Cl.[2] C08L *61/06*

U.S. Cl. 260—29.3 8 Claims

1. A heat curable aqueous binder composition for use as a glass fiber binder capable, when cured, of withstanding temperatures in the range of 750° F. to 900° F., consisting essentially of the reaction mixture of a water soluble modified phenol formaldehyde condensate, boric acid, ammonium hydroxide and urea; wherein said modified phenol formaldehyde condensate, consisting essentially of the reaction product of phenol, formaldehyde and a di-functional nitrogenous compound, is initially prepared by reacting one mole of a di-functional compound in which said functional groups are amido or imino groups capable of reacting with the hydroxymethylene groups of the poly-hydroxymethyl phenols formed by the condensation of phenol and formaldehyde, with about 2.5 to 3 moles of phenol and about 6 to 7.5 moles of formaldehyde such that said modified phenol formaldehyde condensate contains less than 2% by weight of free phenol and less than 5% by weight of free formaldehyde and about 12 to 15% by weight of nitrogen with substantially no unreacted nitrogenous compound; and, thereafter reacting said modified phenol formaldehyde condensate with about 12 to 16 parts by wt. of boric acid for each 100 parts by weight of said condensate, and about 40 to 80 parts by wt. of urea for each 100 parts by weight of said condensate and sufficient ammonium hydroxide so that the final composition has a pH of about 7 to 9.

4,176,106

PHENOL/FORMALDEHYDE RESOLES AND CELLULAR PRODUCTS DERIVED THEREFROM

Wallace G. Reid, Katonah, N.Y.; Rakesh Saini, Somerville, N.J., and Kenneth E. Atkins, South Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

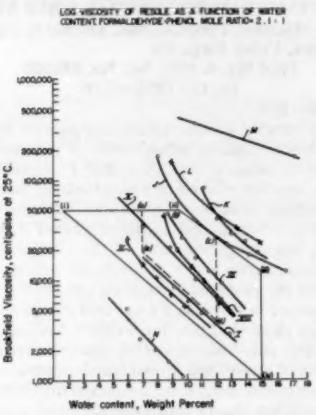
Filed Jul. 28, 1977, Ser. No. 820,020

Int. Cl.[2] C08L *61/08, 61/10*

U.S. Cl. 260—29.3 13 Claims

1. A phenolic resole capable of being foamed to a phenolic foam having a density from 1.90 to 3.70 pounds per cubic foot and, within said density range, a friability of less than 35 percent weight loss (after 10 minutes) and a compressive strength (parallel of at least 20 pounds per square inch which resole has been produced by the base-catalyzed condensation of formaldehyde and phenol at a formaldehyde-to-phenol mole ratio from about 1.6:1 to about 2.2:1, the aqueous alkaline condensate having been brought to a pH from about 5.0 to about 7.0 by the addition thereto of a salt-forming acidic compound, said resole being characterized by an average molecular weight such that a plot of log viscosity as a function of water content of the resole falls within the area defined by straight line interconnection in series of points (i)–(iv) where points (i)–(iv) are as follows for the indicated formaldehyde-to-phenol mole ratios:

(a) at a formaldehyde-to-phenol mole ratio of at least 1.9:1 and no more than about 2.2:1, points (i)–(iv) are:
(i) a viscosity of about 50,000 centipoise at a water content of about 1.7 weight percent;
(ii) a viscosity of about 50,000 centipoise at a water content of about 9.5 weight percent;
(iii) a viscosity of about 12,000 centipoise at a water content of about 15.0 weight percent; and
(iv) a viscosity of about 1,000 centipoise at a water content of about 15.0 weight percent;
(b) at a formaldehyde-to-phenol mole ratio of at least 1.7:1 and less than 1.9:1, points (i)–(iv) are:
(i) a viscosity of about 50,000 centipoise at a water content of about 3.0 weight percent;
(ii) a viscosity of about 50,000 centipoise at a water content of about 14.0 weight percent;


LOG VISCOSITY OF RESOLE AS A FUNCTION OF WATER CONTENT FORMALDEHYDE-PHENOL MOLE RATIO= 2.1 : 1
Brookfield Viscosity, centipoise at 25°C.
Water content, Weight Percent

(iii) a viscosity of about 25,000 centipoise at a water content of about 16.0 weight percent; and
(iv) a viscosity of about 1,000 centipoise at a water content of about 16.0 weight percent;
(c) at a formaldehyde-to-phenol mole ratio of at least about 1.6:1 and less than 1.7:1, points (i)–(iv) are:
(i) a viscosity of about 50,000 centipoise at a water content of about 6.5 weight percent;
(ii) a viscosity of about 50,000 centipoise at a water content of about 12.5 weight percent;
(iii) a viscosity of about 25,000 centipoise at a water content of about 16.0 weight percent; and
(iv) a viscosity of about 3,000 centipoise at a water content of about 16.0 weight percent;

wherein the said viscosity values are Brookfield at 25° C.

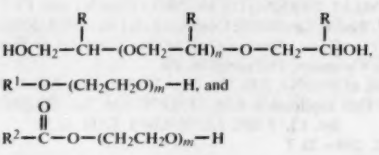
4,176,107

WATER-SOLUBLE DISPERSIONS OF HIGH MOLECULAR WATER-SOLUBLE POLYMERS CONTAINING A SURFACTANT AND A WATER-SOLUBLE ORGANIC CARRIER WHICH IS A HYDROXY COMPOUND CONTAINING REPEATING ALKYLENE OXIDE UNITS

John D. Buckman; Wood E. Hunter; John D. Pera, and Robert M. Taylor, all of Memphis, Tenn., assignors to Buckman Laboratories, Inc., Memphis, Tenn.

Filed Jan. 20, 1978, Ser. No. 871,051
Int. Cl.[2] C08L *33/02*
U.S. Cl. 260—29.6 E **19 Claims**

1. A composition comprising a water-soluble vinyl addition polymer, water, at least one surfactant and a water-soluble organic carrier selected from the group consisting of



wherein R is hydrogen or methyl; R^1 is alkyl containing 6 to 26 carbon atoms or alkyl substituted benzene in which the alkyl substituent is branched or straight chain and contains 8 to 12 carbon atoms; R^2 is alkyl containing 5 to 17 carbon atoms; n varies from 2 to 20 and m varies from 3 to 10.

4,176,108

HEAT-COAGULABLE LATEX BINDERS AND PROCESS FOR THE PREPARATION THEREOF

Ronald J. Caimi, Somerset, and Walter F. Schlauch, Bridgewater, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 828,700, Aug. 29, 1977, abandoned. This application Apr. 17, 1978, Ser. No. 897,042
Int. Cl.[2] C08K *3/24*
U.S. Cl. 260—29.6 TA **10 Claims**

1. In a process for preparing copolymer latex binders of the type wherein the copolymer latex is formed by emulsion polymerization of acrylate or vinyl acetate monomers or mixtures thereof and from 0.1 to 10% by weight of 2-hydroxyethyl or 2-hydroxypropyl acrylate or methacrylate monomers, the improvement which comprises employing in combination with said copolymer a surfactant system consisting of 0.2–10% by weight, based on latex solids, of an anionic surfactant and 0.3–15% by weight, on latex solids, of a nonionic surfactant, wherein the ratio of anionic to nonionic surfactant is between 1:1.5 and 1:3, and adding to said copolymer latex after polymerization from 1 to 40% by weight, based on latex solids, of a water-soluble salt, the resulting latex binder being characterized by its stability to coagulation at room temperature and its ability to coagulate at a temperature between 40° and 85° C.

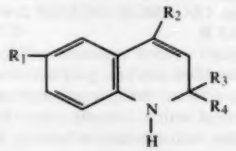
4,176,109

WATER-SOLUBLE COATING COMPOSITION

Atsushi Kaiya, Kawasaki; Yutaka Otsuki, and Hideo Horii, both of Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Division of Ser. No. 518,824, Oct. 29, 1974, abandoned, which is a continuation of Ser. No. 851,905, Nov. 16, 1977, Pat. No. 4,145,501. This application Oct. 25, 1977, Ser. No. 844,543
Claims priority, application Japan, Nov. 1, 1973, 48/123042
Int. Cl.[2] C08K *5/09*
U.S. Cl. 260—31.2 MR **12 Claims**

1. A water-soluble coating composition comprising an adduct (1) of a butadiene lower polymer or lower copolymer (A) which has a number average molecular weight in a range of 200–10,000 and is liquid or semi-liquid at room temperature and α,β-ethylenically unsaturated dicarboxylic acid compound (B) resulting from the reaction of said (A) and (B) at a temperature in the range of 120° to 250° C. in the presence of at least one quinoline derivative (C) in an amount of 0.005 to 5 percent by weight of said (A), said quinoline derivative being of the general formula:



in which R_1 is a hydrgen atom or an alkoxy group having 1 to 5 carbon atoms, and R_2, R_3 and R_4 are the same or different alkyl groups each having 1 to 5 carbon atoms; a hydrophilic solvent (2) in an amount of less than 100 parts by weight to 100 parts by weight of said (A); and a neutralizer (3) in a range of 0.2 to 2.0 equivalents to said (A).

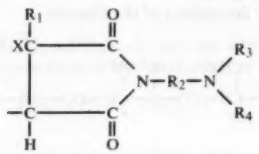
4,176,110

ELECTROCOATING COMPOSITION FOR CATHODIC ELECTRODEPOSITIONS

Yutaka Otsuki, Yokohama; Yoshihiko Araki, Kawasaki, and Kazuho Aoyama, Tokyo, all of Japan, assignors to Nippon Petroleum Company, Limited, Tokyo, Japan

Filed Jan. 31, 1978, Ser. No. 873,902
Claims priority, application Japan, Feb. 4, 1977, 52-10803
Int. Cl.[2] C08K *5/09;* **C08L** *63/00*
U.S. Cl. 260—31.8 N **12 Claims**

1. An electrocoating composition for cathodic electrodepositions which comprises a water-miscible mixture composed of (A) a substituted conjugated diene polymer or copolymer having a molecular weight of 300–5000 and containing basic groups of the general formula:



wherein R_1 is a hydrogen atom, a halogen atom or an organic residue with 1–3 carbon atoms; R_2 and R_3 are organic residues with 1–20 carbon atoms; R_4 is a hydrogen atom or an organic residue with 1–20 carbon atoms; and X is a hydrogen atom or a bond, and if X is a bond the carbon atom to which R_1 is attached and the carbon atom adjacent to said carbon atom and carrying the hydrogen atom may be part of the main chain, in a proportion of 0.05–0.5 moles per 100 grams of the said conjugated diene; and (B) not more than 30 parts by weight per 100 parts by weight of (A) of at least one resin selected from epoxy resins, said mixture of (A) and (B) being neutralized with an acid.

4,176,111

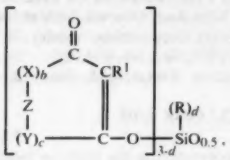
MOISTURE CURABLE ORGANOPOLYSILOXANES

James A. Cella, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 24, 1978, Ser. No. 927,289
Int. Cl.[2] C08L *83/06*
U.S. Cl. 260—37 SB **5 Claims**

1. Moisture curable organopolysiloxane compositions comprising an organopolysiloxane consisting essentially of chemically combined units of the formula,

and having terminal siloxy units of the formula,



where R is a $C_{(1-13)}$ monovalent organic radical, R^1 is selected from hydrogen, halogen and R, X and Y are divalent radicals selected from —O—, —S— and

Z is a divalent $C_{(1-13)}$ organic radical selected from alkylene, cycloalkylene, arylene and a fused ring structure, b and c are equal to 0 or 1, R^2 is selected from hydrogen and R, and d is a whole number having a value of 0 or 1.

5. A moisture curable organopolysiloxane composition in accordance with claim **1**, reinforced with silica filler.

4,176,112

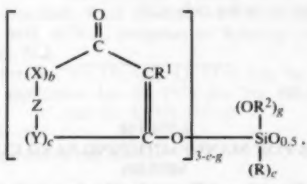
MOISTURE CURABLE ALKOXY ORGANOPOLYSILOXANES

James A. Cella, Clifton Park, and Tyrone D. Mitchell, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 24, 1978, Ser. No. 927,284
Int. Cl.[2] C08L *83/06*
U.S. Cl. 260—37 SB **5 Claims**

1. Moisture curable organopolysiloxane compositions comprising an organopolysiloxane consisting essentially of chemically combined units of the formula,

and having terminal alkoxysiloxy units of the formula,



where R is a $C_{(1-13)}$ monovalent organic radical, R^1 is selected from hydrogen, halogen and R, R^2 is a $C_{(1-8)}$ alkyl radical, X and Y are divalent radicals selected from —O—, —S— and

Z is a divalent $C_{(1-13)}$ organic radical selected from alkylene, cycloalkylene, arylene and a fused ring structure, b and c are equal to 0 or 1, R^3 is selected from hydrogen and R, e is a whole number having a value of 0 or 1, g is equal to 1 or 2, and the sum of e+g is equal to 1 or 2.

4,176,113
PROCESS FOR DYEING POLYESTERS IN THE MELT

Arnold Wick, Therwil, and Max Jost, Oberwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

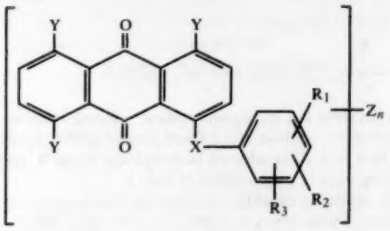
Filed Oct. 21, 1977, Ser. No. 844,326

Claims priority, application Switzerland, Nov. 2, 1976, 13793/76

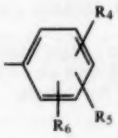
Int. Cl.[2] C08K *5/08*

U.S. Cl. 260—40 P **9 Claims**

1. A process for dyeing polyesters in the melt, by intimately mixing with said polyester in the melt, an anthraquinone derivative of the formula



wherein R_1 is hydrogen, halogen, alkyl or alkoxy having 1–4 C atoms, and R_2 and R_3 are hydrogen, halogen or alkyl having 1–4 C atoms, with R_2 and R_3 being hydrogen if R_1 is alkoxy, X is an —NH— group or an —S— atom, one Y is the radical of the formula —NHCOR and the other two Y groups are hydrogen, with R being alkyl having 1–4 C atoms, a mononuclear five- or six-membered heterocyclic radical or a radical of the formula



in which R_4 is hydrogen, halogen, hydroxyl, alkyl or alkoxy having 1–4 C atoms, phenyl or phenoxy, R_5 is hydrogen, halogen or alkyl having 1–4 C atoms and R_6 is hydrogen or halogen, with R_6 being halogen if R_4 is halogen or alkyl, Z is halogen and n is O, 1, 2 or 3, and 1–3 Z's can be bound as substituents R_1 to R_3 and/or as substituents on the anthraquinone nucleus or on the radical R.

4,176,114
PROCESS FOR MANUFACTURING SAND CORES OR MOLDS

Patrick H. Stewart, and Wayne D. Woodson, both of Danville, Ill., assignors to C L Industries, Inc., Danville, Ill.

Filed Jan. 24, 1978, Ser. No. 871,772

Int. Cl.[2] C08K *3/36*

U.S. Cl. 260—42.29 **15 Claims**

1. A process for the manufacture of sand cores or molds which comprises mixing sand with an acid-curing condensation-type resin comprising high viscosity poly furfuryl alcohol, adding a liquid or solid oxidant to said sand, forming said resin-sand-oxidant mixture into a predetermined shape, treating said shaped resin composition with sulfur dioxide at ambient temperature for a period between a few seconds and a few minutes to form sulfuric acid in situ and effect a rapid resin cure.

4,176,115
FIRE-RESISTANT CONSTRUCTION MATERIAL

Seymour Hartman, Mahopac, and Catherine M. Sheridan, Pawling, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.

Continuation of Ser. No. 613,476, Sep. 15, 1975, abandoned. This application May 6, 1977, Ser. No. 794,368

Int. Cl.[2] C08K *3/32, 3/34, 5/17, 5/05*

U.S. Cl. 260—39 R **10 Claims**

1. A method for producing a fire-resistant construction material comprising preparing an essentially anhydrous, powdered and homogenously admixed blend comprising at least one incombustible component and from about 30 to 70% by total weight of melamine formaldehyde resin and applying sufficient heat and pressure to cure said resin and transform said blend into a rigid, continuously adherent network having a predetermined construction material configuration.

4,176,116
DIPEPTIDE DERIVATIVES

Cedric H. Hassall, Welwyn; William H. Johnson, Hitchin, and Noel A. Roberts, Welwyn Garden City, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

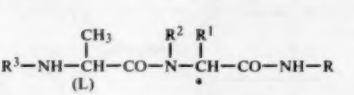
Filed Jun. 8, 1977, Ser. No. 804,681

Claims priority, application United Kingdom, Jun. 21, 1976, 25645/76; Aug. 4, 1976, 32496/76; Mar. 22, 1977, 11997/77

Int. Cl.[2] C07C *103/52;* **C07G** *7/00*

U.S. Cl. 260—112.5 R **24 Claims**

1. Dipeptide derivatives of the formula



(I)

wherein R is methyl, ethyl, propyl or isopropyl; R^1 and R^2 each is hydrogen or methyl, with the proviso that R^1 and R^2 are not simultaneously hydrogen or R^1 and R^2 together are trimethylene; R^3 is selected from unsubstituted alkanoyl containing at least 3 carbon atoms or halo-alkanoyl, nitro-alkanoyl, cyano-alkanoyl, cycloalkylcarbonyl, cyclo-alkyl-alkanoyl, aroyl, aryl-alkanoyl, alkoxycarbonyl, aryloxycarbonyl, arylsulphonyl, alkylsulphonyl, cycloalkylsulphonyl, cyclo alkylsulphinyl, cyclo-alkyl-alkylsulphonyl or cycloalkyl-alkylsulphinyl and the asterisk denotes the configuration at the carbon atom so-marked is L when R^1 is other than hydrogen.

4,176,117
PROCESS FOR OBTAINING GELATIN

Léon Oudem, Av. Casper Libero, 573-1° And. Conj. 3, Sao Paulo, Brazil

Filed Aug. 30, 1977, Ser. No. 828,991

Claims priority, application France, Mar. 11, 1977, 77 07254

Int. Cl.[2] C09H *7/00;* **A23J** *1/10;* **C09H** *3/00*

U.S. Cl. 260—118 **11 Claims**

1. A process for manufacturing gelatin from collagen, said collagen being prepared from animal waste, wherein said animal waste forming the raw materials and constituted by scraps of hides, sinews, tendons, are treated immediately after slaughter of the animal and are subjected to the following successive operations:

(a) the raw materials (derms of hides, sinews or tendons) are washed and de-greased in a solution of sodium hydroxide enabling the pores to dilate and facilitating elimination of the blood and fatty substances;

(b) the materials are subjected to a chopping operation reducing them to the state of paste.

(c) the pH of the paste is adjusted to neutralise the sodium hydroxide returning from initial washing phase (a) and the paste thus returned to a neutral pH is washed several times in cold water and rinsed.

(d) the paste is then subjected to filtration by pressing to

express the water therefrom and to conserve only the solid matter forming the cake constituted by substantially pure collagen.

4,176,118
AROMATIC URETDIONE-DIISOCYANATE-DISULPHONIC ACIDS

Marcel Petinaux, Krefeld; Dieter Dieterich, Leverkusen, and Peter Markusch, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

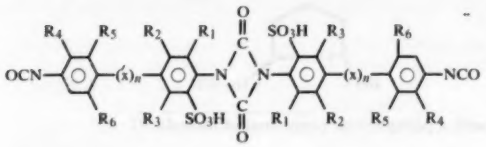
Continuation of Ser. No. 690,494, May 27, 1976, abandoned. This application Nov. 7, 1977, Ser. No. 848,969

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1975, 2524476

Int. Cl.[2] C07D *205/10*

U.S. Cl. 260—239 A **9 Claims**

1. Pulverulent crystalline aromatic uretdione diisocyanate disulphonic acids corresponding to the following formula:



wherein

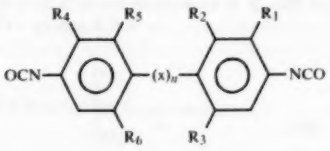
R_1, R_2, R_3, R_4, R_5 and R_6 each represent a hydrogen, chlorine or bromine atom or a methyl, ethyl or C_1–C_4 alkoxy group;

x represents —O—, >C=O, $>SO_2$, or

wherein R_7 and R_8 each represent a hydrogen atom, a methyl or ethyl group or, when taken together with the carbon atom to which they are attached represent a cyclohexyl group; and

n represents 0 or 1.

2. A process for the preparation of pulverulent crystalline aromatic uretdione diisocyanate disulphonic acids, characterized in that a diisocyanate corresponding to the following general formula:



wherein

R_1, R_2, R_3, R_4, R_5 and R_6 each represent a hydrogen, chlorine or bromine atom or a methyl, ethyl or C_1–C_4 alkoxy group;

x represents —O—, >C=O, $>SO_2$, or

wherein R_7 and R_8 each represent a hydrogen atom, a methyl or ethyl group or, when taken together with the carbon atom to which they are attached represent a cyclohexyl group; and

n represents 0 or 1,

is reacted with sulphur trioxide at temperatures of from −30° to +100° C. in anhydrous solvents which are inert towards SO_3 and isocyanate groups.

4,176,119
2,4-PYRIMIDINE-DICARBAMATE-3-OXIDES

Jean-Claude Müller, Rixheim, France, and Henri Ramuz, Birsfelden, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

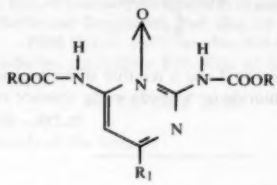
Division of Ser. No. 873,183, Jan. 27, 1978, Pat. No. 4,150,131. This application Dec. 26, 1978, Ser. No. 973,788

Claims priority, application Austria, Feb. 4, 1977, 745/77; Luxembourg, Dec. 5, 1977, 78640

Int. Cl.[2] C07D *239/50, 401/04, 403/04*

U.S. Cl. 260—243.3 **12 Claims**

1. A compound of the formula



II

wherein R is alkyl, alkoxyalkyl, haloalkyl, aralkyl or aryl, and R_1 is dialkylamino, 4-alkyl-1,2,5,6-tetrahydropyridin-1-yl, piperidino, azabicyclononyl, azabicyclooctyl, 3-pyrrolin-1-yl, 3-hydroxy-1-piperidinyl or 4-hydroxy-1-piperidinyl or, when R is haloalkyl, aralkyl or aryl, R_1 can also be 1,2,5,6-tetrahydropyridin-1-yl.

4,176,120
2-[4-(POLYHALO-2-HYDROXY-2-PROPYL)ANILINO]-THIAZOLIN-4-ONES

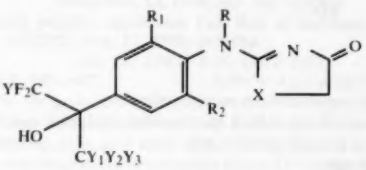
Bernard R. Neustadt, West Orange, and Nicola Zampaglione, Fairfield, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 731,236, Oct. 12, 1976, Pat. No. 4,103,018. This application Apr. 24, 1978, Ser. No. 899,625

Int. Cl.[2] C07D *277/04*

U.S. Cl. 548—184 **6 Claims**

1. A compound of the formula



(I)

wherein X is sulfur; R is hydrogen or lower alkyl; R_1 and R_2 are independently hydrogen, lower alkyl, lower alkoxy or halogen; and Y, Y_1, Y_2 and Y_3 are independently hydrogen, chlorine or fluorine.

4,176,121

1,3-OXAZOLE PHOSPHATES AND PHOSPHONATES

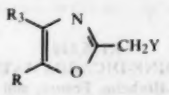
Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 850,764, Nov. 11, 1977, Pat. No. 4,137,308. This application Oct. 25, 1978, Ser. No. 954,495

Int. Cl.[2] **C07D** *263/32, 263/46*

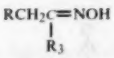
U.S. Cl. 548—119 **3 Claims**

1. A compound having the formula



in which R is phenyl, phenylthio, phenoxy or lower alkylthio; R_3 is lower alkyl and Y is chloro or bromo, provided that when R is isopropylthio, R_3 is a lower alkyl group containing from 1 to 3 carbon atoms.

2. A process for producing a compound as defined in claim 1 comprising reacting a methyl ketone oxime having the formula



with between a two-fold and a ten-fold stoichiometric excess of chloroacetyl chloride or bromide in the absence of an acid acceptor.

4,176,122

PROCESS FOR THE PREPARATION OF BICYCLIC ENONE COMPOUNDS

István Székely Szentendre; István Tömösközi, Budapest; Gábor Kovács, Budapest; Vilmos Simonidesz, Budapest; Marianna Lovász née Gáspar, Budapest; Borbála née Ördög Keresztes, Budapest; Julia née Rádöczi Remport, Budapest; István Stadler, Budapest; Zsuzsa née Gombos Visky, Budapest, and Csaba Szántay, Budapest, all of Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek, Budapest, Hungary

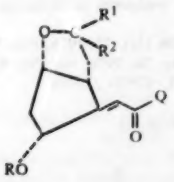
Filed Feb. 22, 1977, Ser. No. 770,997

Claims priority, application Hungary, Feb. 23, 1976, CI 1645

Int. Cl.[2] **C07D** *307/93*

U.S. Cl. 260—343.3 P **8 Claims**

1. A process for the preparation of a racemic or optically active compound formula V,



V

wherein

R is hydrogen, acyl, or silyl,

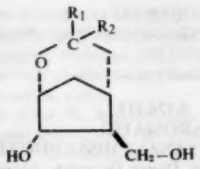
R^1 and R^2 together form an oxo group or

R^1 is lower alkoxy, which can be substituted with one, two or three halogen atom(s) and

R^2 is hydrogen,

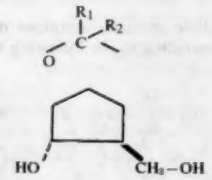
Q is a straight or branched chained alkyl alkenyl or alkinyl having one to 10 carbon atoms, said alkenyl containing one double bond, said alkinyl containing one triple bond,

which comprises reacting a racemic or optically active lactone diol derivative of formula III



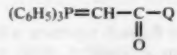
(III)

with an oxidant selected from the group which consists of thioanisole, effective sulfide complexes with chlorine, sulfoxides and effective chromium complex oxidants, then further reacting the thus obtained aldehyde of formula II



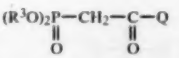
(II)

with a phosphorous compound of formula VI



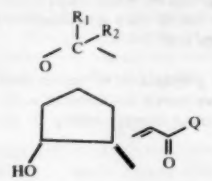
(VI)

or VII



(VII)

wherein R^3 is lower alkyl then acylating or silylating the hydroxyl of the obtained compounds of formula VIII



(III)

4,176,123

STEROID INTERMEDIATES

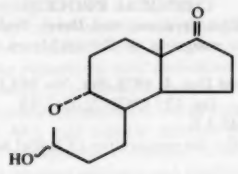
John C. Knight, and Merle G. Wovcha, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 873,101, Jan. 30, 1978, abandoned, which is a division of Ser. No. 767,369, Feb. 10, 1977, abandoned, which is a division of Ser. No. 632,650, Nov. 17, 1975, Pat. No. 4,042,459. This application Nov. 20, 1978, Ser. No. 961,965

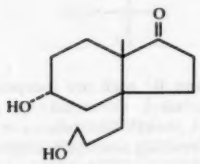
Int. Cl.[2] **C07D** *311/02;* **C07C** *49/28*

U.S. Cl. 260—345.2 **2 Claims**

1. A compound of the formula



2. A compound of the formula



4,176,124

SILICON-MODIFIED PHTHALIC ACID DERIVATIVES

Roland Darms, Therwil; Siegfried Wyler, Dornach, both of Switzerland, and Gerd Greber, Bad Vöslau, Austria, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

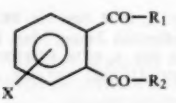
Filed Aug. 30, 1978, Ser. No. 938,171

Claims priority, application Switzerland, Sep. 9, 1977, 11066/77

Int. Cl.[2] C07F 7/02, 7/04, 7/18

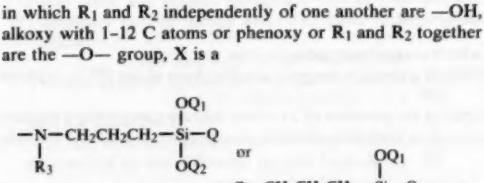
U.S. Cl. 260—346.3 4 Claims

1. A compound of the formula I

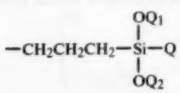


(I)

in which R_1 and R_2 independently of one another are —OH, alkoxy with 1–12 C atoms or phenoxy or R_1 and R_2 together are the —O— group, X is a



R_3 is alkyl with 2–7 C atoms, cycloalkyl with 5–7 C atoms, benzyl or



Q is methyl, phenyl or $—OQ_3$ and Q_1, Q_2 and Q_3 independently of one another are alkyl with 1–6 C atoms or phenyl.

4,176,125

PROCESS FOR PRODUCING 1,4-DIHYDROANTHRAQUINONE

Ryo Matsuura, Yamato; Shuichi Nakatani; Yukio Nomiyama, both of Yokohama, and Tadashi Ninomiya, Kawasaki, all of Japan, assignors to Kawasaki Kasei Chemicals Ltd., Tokyo, Japan

Filed Nov. 17, 1977, Ser. No. 852,432

Int. Cl.[2] C07C 49/68

U.S. Cl. 260—369 3 Claims

1. In a process for producing 1,4-dihydroanthraquinones by oxidizing 1,4,4a,9a-tetrahydroanthraquinone or 1,4-dihydroanthrahydroquinone which may contain inert substituents with molecular oxygen, the improvement which comprises carrying out said oxidation at a reaction temperature of from 10° C. to 70° C. and a pH of 8.5 to 12 in an aqueous medium in the presence of a quinone type redox catalyst, said inert substituents being selected from the group consisting of C_1–C_8 alkyl, halogen, haloalkyl, and phenyl.

4,176,126

NOVEL CORTICOIDS

Klaus Annen; Henry Laurent; Helmut Hofmeister; Rudolf Wiechert; Hans Wendt, and Joachim-Friedrich Kapp, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

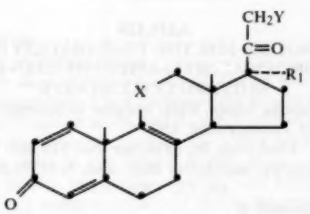
Filed Oct. 4, 1977, Ser. No. 839,486

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1976, 2645104

Int. Cl.[2] C07J 71/00

U.S. Cl. 260—397.45 15 Claims

1. Corticoids of the formula



wherein

X is β-hydroxymethylene, β-fluoromethylene or carbonyl;

Y is fluorine or chlorine; and

R_1 is acyloxy of 1–10 carbon atoms.

4,176,127

PROCESS FOR THE PRODUCTION OF SILANES FROM OLEIC ACID ESTERS

Hans-Ulrich Hempel, Overath Vrlkerath; Hans-Jürgen Klüppel, and Peter Volgnandt, both of Düsseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA), Dusseldorf-Holthausen, Fed. Rep. of Germany

Filed Nov. 13, 1978, Ser. No. 959,944

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1977, 2752973; Aug. 17, 1978, 2836054

Int. Cl.[2] C08H 3/00; C07F 7/02

U.S. Cl. 260—407 8 Claims

1. In the process for the production of a long chain silane consisting essentially of reacting a hydrogen silane with a commercial oleic acid ester with a lower alkanol in the presence of a catalyst at a temperature above 50° C. and recovering said long chain silane, the improvement consisting essentially of utilizing a commercial oleic acid ester with a lower alkanol containing less than 4% by weight to poly-unsaturated compounds, as said oleic acid ester.

2. The process of claim 1 wherein said commercial oleic acid

ester with a lower alkanol containing less than 4% by weight of poly-unsaturated compounds was derived from a commercial oleic acid ester with a lower alkanol having over 4.1% of poly-unsaturated compounds.

3. The process of claims 1 or 2 wherein the proportion of poly-unsaturated compounds in said commercial oleic acid ester with a lower alkanol was reduced by dimerization of these compounds.

4,176,128

PROCESS FOR INCREASING THE MOLECULAR WEIGHT OF SILICON COMPOUNDS

Bernward Deubzer, Burghausen, and Norbert Egerter, Emmerting, both of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 26, 1978, Ser. No. 973,787

Claims priority, application Fed. Rep. of Germany, Jan. 1, 1978, 2801779

Int. Cl.[2] C07F *7/08*

U.S. Cl. 260—448.2 E **2 Claims**

1. A process for increasing the molecular weight of silicon compounds containing Si-bonded alkoxy groups which comprises hydrolyzing silicon compounds containing the Si-bonded alkoxy groups as essentially the only hydrolyzable groups at increased temperature in the presence of a hydrated salt selected from the group consisting of a salt of ammonium hydroxide and a metal of the first to the third principal group of the Periodic System of elements according to Mendeleeff, in an amount of at least 8 grams of hydrated salt per mol of hydrolyzable group while distilling off the alcohol as it is evolved to form a product which does not solidify when cooled to at least room temperature.

4,176,129

PROCESS FOR THE PREPARATION OF TRIS(HYDROXYMETHYL)-AMINOMETHAN-LACTATE-DIHYDROXYALUMINATE

Massimo Fazzini, Milan, Italy, assignor to Scharper S.p.A. Per l'Industria Farmaceutica, Italy

Filed May 26, 1978, Ser. No. 910,085

Claims priority, application Italy, Jun. 7, 1977, 24428 A/77

Int. Cl.[2] C07F *5/06*

U.S. Cl. 260—448 R **4 Claims**

1. A process for the production of tris (hydroxymethyl)-aminomethan-lactate-dihydroxyaluminate which comprises reacting equimolar quantities each of: (a) lactic acid, (b) tris(-hydroxymethyl)aminomethane, and (c) aluminum isopropylate.

4,176,130

PROCESS FOR PREPARING ACYLOXYSILANES AND ACYLOXYSILOXANES

Peter John, Burghausen, Fed. Rep. of Germany; Wolfgang Feichtner, Ach, Austria; Werner Graf, and Volker Frey, both of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 28, 1978, Ser. No. 974,200

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1978, 2801780

Int. Cl.[2] C07F *7/08*

U.S. Cl. 260—448.2 E **7 Claims**

1. A process for preparing acyloxysilanes by reacting a chlorosilane with an aliphatic carboxylic acid in a column at an elevated temperature, the improvement which comprises passing an aliphatic carboxylic acid in the vapor phase upwards from the bottom of the column countercurrent to the flow of the chlorosilane, in which the aliphatic carboxylic acid is introduced into the column at such a rate that the carboxylic acid does not exceed 1.3 mol per gram atom of Si-bonded chlorine in the column while removing the acyloxysilane at the bottom of the column.

4,176,131

CHEMICAL PROCESS

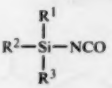
Kun M. Shih, East Syracuse, and Derek Walker, Jamesville, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed Dec. 4, 1978, Ser. No. 966,177

Int. Cl.[2] C07F *7/10, 7/18*

U.S. Cl. 260—448.2 E **10 Claims**

1. A process for the preparation of a silyl isocyanate of the formula



I

wherein R^1, R^2 and R^3 each are independently hydrogen, isocyanato, (lower)alkyl, (lower)alkoxy, phenyl, phenoxy, phenyl(lower)alkyl, phenyl(lower)alkoxy or cycloalkyl; which process comprises reacting a halogen compound of the formula

II

wherein W is R^1, chloro, bromo, fluoro or iodo; X is R^2, chloro, bromo, fluoro, or iodo; Y is R^3, chloro, bromo, fluoro or iodo; and Z is chloro, bromo, fluoro or iodo; with from about 1 to about 1.5 equivalents of an alkali metal cyanate for each halogen present in compound II, in an inert solvent having a dielectric constant below about 10, at a temperature of from about 0° C. to about 200° C., in the presence of a crown ether as a catalyst.

4,176,132

REACTION OF ORGANIC DIISOCYANATES WITH WATER

Akira Ide, and Sojiro Matsumoto, both of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 1, 1978, Ser. No. 882,466

Claims priority, application Japan, Mar. 1, 1977, 52-21882; Jan. 20, 1978, 53-5053; Feb. 6, 1978, 53-12097

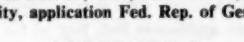
Int. Cl.[2] C07C *119/042, 119/045, 119/048*

U.S. Cl. 260—453 A **22 Claims**

1. In a process for the preparation of an organic polyisocyanate which comprises reacting an aliphatic, alicyclic or araliphatic diisocyanate monomer with water, the improvement which comprises conducting the reaction

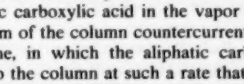
(a) at a reaction temperature of at from about 70° C. to about 200° C.;

(b) in the presence of a solvent mixture comprising a mixture of at least one ethylene glycol derivative of the formula (I):



(I)

wherein R_1 and R_2, which may be the same or different, each represents an alkyl group having 1 to 4 carbon atoms, which may be straight chain or branched chain, or an acetyl group and n is an integer of 1 to 2; and at least one phosphoric acid derivative of the formula (II):



(II)

wherein R_3, R_4 and R_5, which may be the same or different, each represents a methyl group or an ethyl group;

(c) with the proportion of the solvent mixutre in the reaction mixture being 10 to 80 wt%; and

(d) with the proportion of the ethylene glycol derivative (I) in the solvent mixture being 30 to 90 wt% and the proportion of the phosphoric acid derivative (II) in the solvent mixture being 10 to 70 wt%, wherein the molar ratio of the diisocyanate monomer to water ranges from about 5:1 to about 40:1, said solvent mixture providing the dual effects of substantially completely eliminating the formation of by-product polyurea and inhibiting the amounts of monomer present after long term storage of the reaction product.

4,176,133
PROCESS FOR ISOLATING N,N-DIMETHYLAMINOACETONITRILE FROM WATER MIXTURES

Manfred Lenthe, Odenthal, and Gerhard Dankert, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 19, 1978, Ser. No. 953,048

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1977, 2748964

Int. Cl.[2] C07C *121/43*

U.S. Cl. 260—465.5 R **7 Claims**

1. In the recovery of N,N-dimethylaminoacetonitrile from a mixture thereof with water by extraction with an organic solvent thereby to form an aqueous phase and an organic solvent phase containing the nitrile, separating the organic phase, and recovering the nitrile from the organic solvent, the improvement which comprises effecting the extraction at about 5° to 90° C. with about 1.5 to 10 parts by weight of 1,2-dichlorobenzene per part by weight of the water/nitrile mixture.

4,176,134
AROMATIC SULFONAMIDE SULFONYL CHLORIDE COMPOUNDS

Hideo Ueda, and Hiroshi Sawaguchi, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

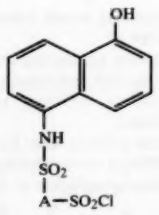
Filed Jan. 9, 1978, Ser. No. 868,164

Claims priority, application Japan, Jan. 11, 1977, 52-1797

Int. Cl.[2] C07C *143/70*

U.S. Cl. 260—543 R **2 Claims**

1. An aromatic sulfonamide sulfonyl chloride compound represented by the following general formula (I)



(I)

wherein A represents a divalent benzene nucleus in which the bonding thereto is symmetrical.

4,176,135
PROCESS FOR PREPARING HYDRAZODICARBONAMIDE

Shigeaki Ohno, Naruto; Toshiyuki Kazuta, Tokushima, and Takeshi Iwata, Naruto, all of Japan, assignors to Otsuka Kagaku Yakuhin Kabushiki Kaisha, Osaka, Japan

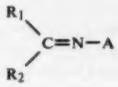
Filed Jan. 23, 1978, Ser. No. 871,410

Claims priority, application Japan, Mar. 24, 1977, 52-33111

Int. Cl.[2] C07C *133/02*

U.S. Cl. 260—554 **13 Claims**

1. A process for preparing hydrazodicarbonamide by reacting a compound represented by the formula



(I)

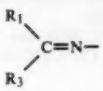
wherein

R_1 is hydrogen atom or alkyl having from 1 to 4 carbon atoms;

R_2 is alkyl having from 1 to 4 carbon atoms, cycloalkyl having from 4 to 8 carbon atoms or aryl having from 6 to 10 carbon atoms;

R_1 and R_2, when taken together with the carbon atom to which they are attached, form an aliphatic ring or heterocyclic ring; and

A is NH_2— or



wherein

R_1 is as defined above,

R_3 is alkyl having from 1 to 4 carbon atoms, cycloalkyl having from 4 to 8 carbon atoms or aryl having from 6 to 10 carbon atoms, and R_1 and R_3, when taken together with the carbon atom to which they are attached, form an aliphatic ring or heterocyclic ring,

wherein urea in an aqueous medium with heating in the absence of any added mineral acid and in the presence of a salt selected from the group consisting of metal salts of mineral acid, ammonium salts of mineral acid, metal salts of organic acid and ammonium salts of organic acid, having a solubility of at least about 0.1 wt. % in the aqueous medium and wherein the compound of formula (1) is continuously or intermittently introduced into the reaction system while the carbonyl compound and ammonia produced are being withdrawn from the reaction system.

4,176,136
PROCESS FOR PREPARING ETHYLIDENE-BIS-ACETAMIDE

Daniel J. Brenzel, Menlo Park, Calif., assignor to Dynapol, Palo Alto, Calif.

Filed May 31, 1977, Ser. No. 801,485

Int. Cl.[2] C07C *102/00*

U.S. Cl. 260—561 R **13 Claims**

1. The process for preparing ethylidene bisacetamide which comprises contacting a liquid admixture comprising acetamide, acetaldehyde and water in an amount of up to 500% by weight inclusive based on the amount of acetaldehyde and acetamide with a solid cation exchange resin in H^+ form at a weight hourly space velocity of from about 0.01 to about 2 kilograms of acetaldehyde per kilogram of resin per hour and a temperature of from about 25° C. to about 110° C. thereby forming an ethylidene bis/acetamide-containing reaction product and thereafter separating said reaction product from said cation exchange resin.

4,176,137

MANUFACTURE OF CARBOXYLIC ACID AMIDES

Rolf Platz, Mannheim; Toni Dockner, Meckenheim; Jürgen Heners, Lingen, and Herbert Krüg, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 13, 1978, Ser. No. 959,733

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1977, 2751236

Int. Cl.[2] C07C *102/08*

U.S. Cl. 260—561 N 16 Claims

1. A process for the manufacture of carboxylic acid amides by addition reaction of water with nitriles in the presence of a copper-containing catalyst, wherein the reaction is carried out with a catalyst which contains copper and a magnesium silicate produced in the presence of a copper compound by precipitation of a magnesium compound with an alkali metal silicate, the catalyst being treated with a reducing gas at an elevated temperature, and wherein the magnesium silicate prepared as described above and separated from the precipitation medium is mixed with from 3 to 50 percent by weight, based on magnesium silicate, of a cement having a particle size of from 1 to 100 micrometers.

4,176,138

PROCESS FOR PREPARING P-AMINOPHENOL IN THE PRESENCE OF DIMETHYLDODECYLAMINE SULFATE

Sharad S. Sathe, Maryland Heights, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Oct. 27, 1978, Ser. No. 955,442

Int. Cl.[2] C07C *89/00*

U.S. Cl. 260—575 6 Claims

1. A method for preparing p-aminophenol, with aniline as a by-product, by the catalytic hydrogenation of nitrobenzene in an acidic reaction medium containing dimethyldodecylamine sulfate.

4,176,139

PROCESS FOR PREPARING UNSATURATED SPIRANIC DERIVATIVES

Ferdinand Naf, Geneva, and Rene Decorzant, Onex, both of Switzerland, assignors to Firmenich SA, Geneva, Switzerland

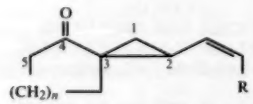
Filed Aug. 18, 1978, Ser. No. 934,828

Claims priority, application Switzerland, Aug. 26, 1977, 10435/77

Int. Cl.[2] C07C *45/00, 49/54*

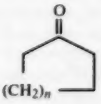
U.S. Cl. 260—586 C 8 Claims

1. Process for preparing an unsaturated spiro derivative of formula



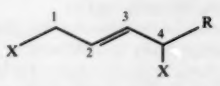
(I)

wherein index n represents integer 1 or 2 and wherein symbol R defines a lower alkyl radical, which comprises treating, in the presence of a strong base, a cycloalkanone of formula



(II)

wherein index n has the above given meaning, with a dihaloalkene of formula



(III)

wherein symbol R is defined as above and X represents a halogen atom.

4,176,140

DEHYDROGENATION OF HYDROCARBONS WITH ZINC TITANATE CATALYST

Brent J. Bertus, and Darrell W. Walker, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 743,193, Nov. 19, 1976, abandoned. This application Oct. 27, 1977, Ser. No. 844,931

Int. Cl.[2] C07C *11/12*

U.S. Cl. 585—629 22 Claims

1. A process for catalytically dehydrogenating a dehydrogenatable hydrocarbon feedstock having at least one

grouping which comprises: contacting said feedstock with a regenerable dehydrogenation catalyst in the substantial absence of free oxygen under dehydrogenation conditions wherein said regenerable dehydrogenation catalyst is prepared by calcining a mixture of zinc oxide and titanium dioxide and a metal selected from the group consisting of lithium and magnesium at a temperature in the range of from about 650° to about 1050° C.

4,176,141

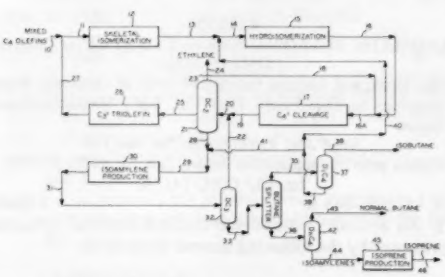
ISOAMYLENES FROM BUTENES

Rolland E. Dixon, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 18, 1978, Ser. No. 952,355

Int. Cl.[2] C07C *11/10, 3/62, 5/22*

U.S. Cl. 585—314 6 Claims



1. A process for converting mixed butenes to isoamylenes which comprises the steps of

(a) passing a first stream comprising mixed butenes to a skeletal isomerization zone and therein subjecting same to isomerization conditions sufficient to convert normal butenes to isobutylene,

(b) passing the reaction product from (a) to a hydroisomerization zone and therein subjecting same to double bond isomerization conditions sufficient to convert butene-1 to butenes-2,

(c) passing the effluent from (b) comprising ethylene, isobutane, normal butane, butenes-2, isobutylene, butene-1, and amylenes to a butenes-2 cleavage zone or disproportion-

ation zone wherein butenes-2 are converted to propylene in the presence of ethylene,

(d) separating the effluent from (c) into an overhead ethylene-rich stream, a propylene-rich side stream, and a bottoms stream comprising isobutylene, isobutane, normal butane, propylene, some butylenes, and some amylenes,

(e) passing said bottoms stream (d) to a disproportionation zone and therein subjecting same to disproportionation conditions such that isobutylene and propylene react to form isoamylenes and ethylene, and

(f) separating the effluent from (e) into separate streams comprising (1) an ethylene/propylene-rich stream, (2) an isobutane-rich stream, (3) a normal butane-rich stream, (4) an isobutane/isobutylene/isobutene-1 containing stream, and (4) an isoamylenes-rich stream.

4,176,142

POWDER COATING COMPOSITION

Robert B. Lewis, Lower Makefield Township, Bucks County, Pa., and Terri A. Giversen, Delaware Township, Hunterdon County, N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Filed May 22, 1978, Ser. No. 908,592

Int. Cl.[2] C08L *63/00*

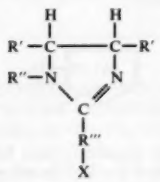
U.S. Cl. 525—336 **12 Claims**

1. A powder coating composition which comprises:

at least one 1, 2 polyepoxy compound;

a functionally terminated elastomer;

a curing agent mixture comprising (1) an imidazoline derivative having the structural formula of



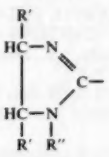
wherein

R′ is selected from the group of hydrogen, alkyl and aryl;

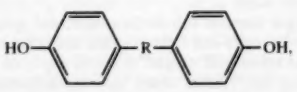
R″ is selected from the group of cycloalkyl, heterocycloalkyl and R′;

R‴ is selected from the group of alkylene and arylene and the foregoing substituted by alkyl and/or aryl; and

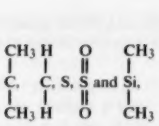
X is hydrogen or the radical



wherein R′ and R″ are as defined previously and (2) an adduct of (a) a polyhydroxyl compound having a structural formula of



where R is selected from the group consisting of



and (b) a diglycidyl ether of said polyhydroxyl compound (a), where reactant (b) is present in less than an equimolar amount to reactant (a).

4,176,143

HIGHLY REACTIVE POWDER RESIN COMPOSITIONS CONTAINING POLYCARBOXYLIC ACID ANHYDRIDES

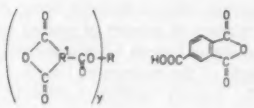
Kürt Kraft, Auringen, and Gerd Walz, Breckenheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

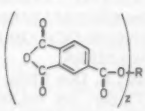
Filed Dec. 13, 1976, Ser. No. 750,135

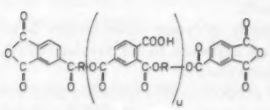
Claims priority, application Fed. Rep. of Germany, Dec. 13, 1975, 2556182

Int. Cl.[2] C08L *63/00, 67/00*

U.S. Cl. 260—835 **16 Claims**







1. A highly-reactive powder resin composition suitable for use in the production of coatings consisting essentially of a mixture of (A) one or more polymers containing groups selected from hydroxyl and 1,2 epoxy-groups, having a melt viscosity of 2,000 to 20,000 cP at 160° C. and a melting range of from 45° to 95° C., and mixtures of said polymers; and (B) one or more compounds of formula (I) of the attached drawings wherein R represents a radical selected from the group consisting of

(a) an unsubstituted mono- to pentavalent aliphatic hydrocarbon group containing from 1 to 28 carbon atoms,

(b) a radical (a) being substituted by one of the groups an ester group containing from 1 to 6 carbon atoms and a carboxy group,

(c) a radical (a) being interrupted at least once by one of the linkages an O-ether linkage and a —HC=CH group,

(d) a piperazine group, and

(e) a group of one of the formulae (XVI) and (XVII) of the attached drawings an aromatic group containing from 6 to 43 carbon atoms of one of the formulae (X) to (XV) of the attached drawings wherein R^3 is a member selected from the group consisting of hydrogen, a halogen atom, an alkyl and an alkoxy group each containing from 1 to 6 carbon atoms and X represents a member selected from the group consisting of an oxygen atom, sulphinyl, sulphonyl, carbonyl and a group of the formulae (XVa) of the attached drawings in which n has the value 1 to 8; R^1 represents a radical selected from the group consisting of phenyl, naphthyl, phenanthryl, aminonaphthyl and a heterocyclic tetranhydrofu-

ryl group such that the anhydride grouping is attached to the said R^1 group on vicinyl carbon atoms; and y is an integer from 2 to 4

said component B having a melt viscosity of 50 to 15,000 cP at 160° C. and a melting range of 40° to 250° C;

the combination of A and B having a melt viscosity of from 500 to 20,000 cP at 160° C., a stability of from 1 to 15 at 100° C., a flow time of from 20 to 600 s at 160° C., and a gel time of from 35 to 1,200 s at 160° C.

4,176,144

BLOCK COPOLYMERS

Frederick C. Schwab, Metuchen, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 19, 1978, Ser. No. 870,791
Int. Cl.[2] C08L *9/06, 9/02*
U.S. Cl. 525—91 **8 Claims**

1. A block copolymer comprising a polar segment and a non-polar segment, the polar segment comprising 1 to 50 percent by weight of the copolymer and being derived from ethylene oxide or ethylene sulfide, the non-polar segment being a hydrogenated copolymer of a diene and methyl ethenyl benzene, the methyl ethenyl benzene being derived from a polymerizable mixture of isomers of methyl ethenyl benzene consisting essentially of 1-methyl-3-ethenyl benzene, at least 85 percent by weight of the mixture of 1-methyl-4-ethenyl benzene, and 0 to 0.1 percent 1-methyl-2-ethenyl benzene.

4,176,145

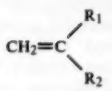
PHOTODEGRADABLE POLYMER COMPOSITIONS COMPRISING BLENDS OF POLYMERS WITH KETONE-CONTAINING BLOCK OR GRAFT COPOLYMERS

James E. Guillet, 34 Sagebrush La., Don Mills, Canada

Filed Feb. 1, 1977, Ser. No. 764,548
Int. Cl.[2] C08L *51/00, 53/00*
U.S. Cl. 525—72 **12 Claims**

1. A synthetic polymer composition having accelerated degradation on exposure to ultraviolet radiation, comprising an intimate admixture of:

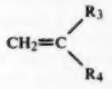
(a) a major proportion of a normally solid synthetic polymer of at least one monomer having the general formula I:



(I)

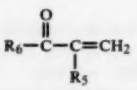
where R_1 represents a hydrogen atom or an alkyl group of from 1 to 6 carbon atoms, and R_2 is selected from the group consisting of a hydrogen atom, an alkyl group of from 1 to 6 carbon atoms, a phenyl group, a carboxylic acid group, a carboxylic acid lower alkyl ester group, a lower acyloxy group, a cyano group, an amido group and an alkenyl group of from 1 to 6 carbon atoms; and

(b) a minor proportion of a compatible polymeric product of graft copolymerization of a grafting member onto a polymeric backbone, said polymeric backbone being a polymer of a first monomer of general formula II:



(II)

wherein R_3 represents a hydrogen atom or an alkyl group of from 1 to 6 carbon atoms and R_4 is selected from the same group of atoms or groups as R_2 above, and said grafting monomer having the general formula III:



(III)

wherein R_5 represents a hydrogen atom or an alkyl group of from 1 to 6 carbon atoms, and R_6 is selected from the group consisting of alkyl groups having from 1 to 6 carbon atoms, aryl groups, alkaryl groups having up to 9 carbon atoms and alkenyl groups having up to 6 carbon atoms, said product of graft copolymerization containing from about 0.2 to about 20 weight percent of ketone carbonyl groups.

4,176,146

PROCESS FOR PRODUCING CURABLE COATING RESINS

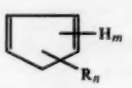
Shozo Tsuchiya, Tokyo; Hideo Hayashi; Makoto Sasaki, both of Yokohama; Kiyoshi Goto, and Kazuyoshi Ihida, both of Tokyo, all of Japan, assignors to Nippon Oil Co., Ltd. and Toyo Ink Manufacturing Co., Ltd., both of Tokyo, Japan

Filed Dec. 14, 1977, Ser. No. 860,367
Claims priority, application Japan, Dec. 22, 1976, 51/153436
Int. Cl.[2] C08F *8/04, 8/14*
U.S. Cl. 525—338 **7 Claims**

1. A process for preparing a radiation or heat curable coating resin (III) comprising the steps of:

hydrogenating selectively the double bonds of a hydroxyl group containing resin (I) produced by reacting

(A) a compound selected from the group consisting of five-membered cyclic compounds having unsaturated conjugated double bonds and being represented by the following general formula



wherein R is an organic residue having 1 to 3 carbon atoms, and m and n are each an integer and are 6 in total, and Diels-Alder's reaction products of the five-membered cyclic compound, with (B) (meth) allyl alcohol to obtain a hydrogenated, hydroxyl group-containing resin (II) and then

esterifying the thus obtained resin (II) with at least one member selected from the group consisting of acrylic and methacrylic acids thereby to obtain a curable coating resin (III).

4,176,147

PLASTICIZED POLYVINYL CHLORIDE BLANKS AND CARTONS

David Moir, Woodcliff Lake, N.J., assignor to Alford Industries, Inc., Ridgefield Park, N.J.

Filed Apr. 21, 1978, Ser. No. 898,537
Int. Cl.[2] H05B *3/00;* **B31B** *15/00*
U.S. Cl. 264—25 **4 Claims**

1. A continuous process for preparing blanks of a plasticized polyvinyl chloride, said plasticized poly-vinyl chloride comprising 1 to 10 parts of a plasticizer per 100 parts of polyvinyl chloride, said plasticizer being an aliphatic acid ester of an alcohol or a glycol wherein each of the acid, alcohol and glycol moreties contains from 6 to 20 carbon atoms, which comprises the steps:

(a) passing a sheet or roll of the plasticized poly-vinyl chloride under infra-red light to raise the temperature of the sheet to about 130° to 160° F.,

(b) passing the heated sheet into a reciprocating action creaser and die cutter, and

(c) simultaneously scoring and cutting blanks.

4,176,148

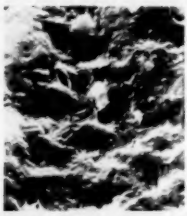
METHOD OF MANUFACTURING MICROPOROUS PAPER-LIKE BUTENE-1 POLYMER SHEETS

Jules Magder, and Murray H. Reich, both of Princeton, N.J., assignors to Princeton Chemical Research, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 335,639, Feb. 26, 1973, abandoned, which is a continuation of Ser. No. 175,988, Aug. 30, 1971, abandoned. This application Jul. 12, 1974, Ser. No. 488,135

Int. Cl.[2] B29D *27/00*

U.S. Cl. 264—41 7 Claims



1. The process for making paper-like sheet material which comprises extruding a composition comprising (a) about 20 to 97% by weight of a butene-1 film-forming polymer having a molecular weight in excess of about 20,000, an isotacticity of at least about 25% and a butene-1 content of at least about 50% by weight, and (b) about 3 to 80% by weight of at least one normally solid filler insoluble in said polymer, to form a sheet, and stretching said sheet below about 60° C. at least about 5% beyond its yield strain substantially over its entire surface, whereby the surface of said sheet is rendered discontinuous due to formation of micropores, said sheet is opacified and rendered paper-like.

4,176,149

APPARATUS AND METHOD OF MANUFACTURE OF TRAINS OF SLIDE FASTENING ELEMENTS

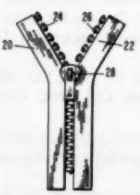
George B. Moertel, Conneautville, Pa., assignor to Textron Inc., Providence, R.I.

Continuation of Ser. No. 659,881, Feb. 20, 1976, abandoned, which is a continuation-in-part of Ser. No. 601,787, Aug. 4, 1975, Pat. No. 4,084,296. This application Jan. 30, 1978, Ser. No. 873,649

The portion of the term of this patent subsequent to Apr. 18, 1995, has been disclaimed.

Int. Cl.[2] B29D *5/00*

U.S. Cl. 264—146 5 Claims



1. A process of forming a train of fastening elements for a slide fastener comprising

rotating a cavity wheel having a row of elongated cavities formed in a periphery of the wheel, each cavity defining a head forming portion and a pair of leg forming portions extending from opposite sides of the head forming portion along the longitudinal dimension of the cavity, said cavity wheel having a plurality of gate channels each extending from one of the pair of leg forming portions of each cavity;

bringing a band into engagement with the periphery of the cavity wheel during a portion of the angular rotation of the cavity wheel to enclose the cavities such that the gate channels extend to one side of the band;

injecting a flowable synthetic polymer resin having long chain molecules into each of the gate channels at the one side of the band such that the flowable synthetic polymer resin flows laminarly in one direction from each gate channel into each respective cavity sequentially along the one leg forming portion, the head forming portion and the other leg portion; and

hardening the flowable synthetic polymer resin in the cavities to form a train of fastening elements.

3. A process of forming a train of fastening elements for a slide fastener comprising

rotating a cavity wheel,

feeding two pairs of connecting filaments into respective pair of spaced grooves extending around the periphery of the cavity wheel and intersecting elongated cavities of respective rows of a pair of spaced rows of fastening element forming cavities formed in the periphery of the cavity wheel,

engaging a pair of bands over spaced portions of the periphery of the cavity wheel to enclose the respective pair of rows of spaced fastening element forming cavities and to enclose gate portions of a row of runner channels extending between pairs of element forming cavities in the respective rows of the element forming cavities during a predetermined angle of rotation of the cavity wheel, portions of the runner channels being exposed between the pair of bands,

injecting a flowable synthetic polymer resin into the exposed portions of the runner channels between the pair of bands such that the synthetic polymer resin flows through the gate portions into the cavities,

hardening the flowable synthetic polymer resin in the cavities and runner channels to form a train of fastening elements with attached runners,

disengaging the pair of bands at the end of the predetermined angle of rotation of the cavity wheel and stripping the hardened train of fastening elements and attached runners from the cavity wheel,

separating the runners and pair of trains of fastening elements from the bands, and

severing the runners from the respective trains of fastening elements.

5. A process of forming a train of fastening elements for a slide fastener comprising

rotating a cavity wheel having a row of elongated cavities formed in a curved periphery of the wheel, each cavity defining a head forming portion and a pair of leg forming portions extending from opposite sides of the head forming portions along the longitudinal dimension of the cavity, said cavity wheel also having a plurality of gate channels extending in the curved periphery of the wheel from the respective cavities;

bringing a band into engagement with a portion of the curved periphery of the cavity wheel during a portion of the angular rotation of the cavity wheel to enclose the cavities such that the gate channels are left exposed in the curved periphery of the wheel on one side of the band;

injecting a flowable synthetic polymer resin against the curved periphery of the cavity wheel and into each of the gate channels at the one side of the band such that the flowable synthetic polymer resin flows through each gate channel under an edge of the band into each respective cavity; and

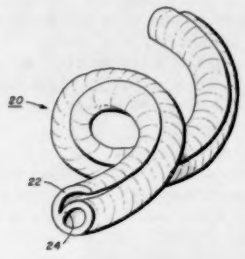
hardening the flowable synthetic polymer resin in the cavities to form a train of fastening elements.

4,176,150

PROCESS FOR TEXTURED YARN

James E. Bromley, and Jing-Peir Yu, both of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 18, 1977, Ser. No. 778,913
Int. Cl.[2] D01D *5/22*
U.S. Cl. 264—168 **2 Claims**



1. A process for melt spinning a filament, comprising:

a. extruding at a given extrusion rate molten melt-spinnable polyester polymer of fiber-forming molecular weight through a spiral cross-section orifice to form a molten stream;

b. quenching said molten stream in a quench zone into a filament by cooling the outer portion of said spiral more quickly than the inner portion of said spiral, and

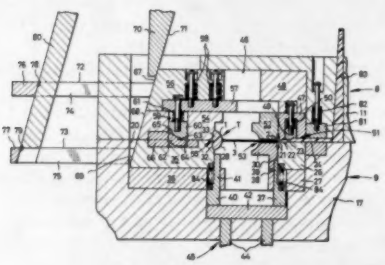
c. withdrawing said filament from said quench zone at a sufficiently high rate that said filament has an elongation below 65% in the absence of a further step of drawing.

4,176,151

METHOD FOR MANUFACTURING AN ARTICLE STOPPER DEVICE

Tadashi Suzuki, Kita-Adachi, Japan, assignor to Sato Gosei Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1977, Ser. No. 865,920
Claims priority, application Japan, Jul. 22, 1977, 52-87466; Oct. 29, 1977, 52-130169
Int. Cl.[2] B29C *17/02*
U.S. Cl. 264—291 **3 Claims**



1. A method of stretching and releasing from a mold an integrally molded, thermoplastic resin stopper device said stopper device having a filament portion, a head portion on one end of said filament portion and a crossbar portion on the other end of said filament portion wherein said head portion has an end part, side faces and an end face, said mold including a first mold means surrounding said crossbar portion of said stopper device, a second mold means surrounding said filament portion and end face of said head portion of said stopper device, and a third mold means surrounding the side faces and end part of said head portion, said third mold means having separable upper and lower mold portions, said upper and lower portions being separable in a plane which includes the axis of said filament, said method of stretching and releasing said stopper device from said mold comprising:

(a) separating said second and third mold means by moving at least one of said second and third mold means away from the other in a direction along the axis of said filament portion of said stopper device, said side faces and end part of said head being adhered to said third mold means wherein said filament is stretched in its axial direction;

(b) stopping movement of one of said upper and lower portions of said third mold means and continuing the movement of the other of said upper and lower portions of the third mold means, thereby separating the side faces and end part of the head portion from the one of said upper and lower portions of the third mold means; and

(c) separating said stopper device from the other of said upper and lower portions of said third mold means, and from said first and second mold means thereby releasing said stopper device from said mold.

4,176,152

HEATING AND STRATIFICATION METHOD FOR AN INJECTION MOLDING MACHINE

Nickolas N. Sokolow, Cheshire, Mass., assignor to Beloit Corporation, Beloit, Wis.

Continuation-in-part of Ser. No. 738,460, Nov. 3, 1976, abandoned, which is a division of Ser. No. 635,791, Nov. 28, 1975, Pat. No. 4,015,916. This application Dec. 1, 1977, Ser. No. 856,306
Int. Cl.[2] B29F *1/12*
U.S. Cl. 264—329 **5 Claims**

1. A method of forming a plastic article in an injection molding machine of the type having a screw that reciprocates and rotates in a barrel said method comprising the steps of:

(1) Introducing unmelted plastic material into the injection molding machine;

(2) partially and incompletely plasticizing said material by the rotary action of the screw;

(3) prior to complete plasticization of the plastic material, stratifying said material by moving the plastic material from the rotary screw to a heating zone comprising a plurality of elongated stratified passageways which extend substantially continuously for the entire length of said heating zone;

(4) heating said material in said stratified passageways by conduction to totally plasticize the plastic material without mixing; and

(5) injecting the plasticized material into a closed mold.

4,176,153

UNITARY, HERMETICALLY-SEALED BUT PIERCEABLE DISPENSING CONTAINER

Gerhard H. Weiler, South Barrington; Dieter H. Nagel, Des Plaines, and Louis T. Pagels, Hanover Park, all of Ill., assignors to Automatic Liquid Packaging, Inc., Arlington Heights, Ill.

Filed Feb. 10, 1978, Ser. No. 876,730
Int. Cl.[2] B29C *17/07*
U.S. Cl. 264—524 **6 Claims**

6. A method of forming, filling and hermetically sealing a pierceable container having a desired content which comprises the steps of

providing an open assembly of sectional mold parts defining a container-forming mold cavity therein when closed;

extruding a parison in the form of a semi-solid, elongated hollow tube between said mold parts;

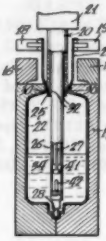
severing a predetermined tube length from the parison to provide an access opening into the severed tube length for receiving a composite mandrel which includes a blowing and filling nozzle and a forming ram member;

closing said assembly about said severed predetermined tube length so as to confine a portion of the tube length between the mold parts and within said container-forming

cavity while closing one end of the confined tube length and permitting the access opening to remain open at the other end of the tube length;

positioning said composite mandrel so as to close the access opening blade and blow-forming said tube length so as to provide semi-solid walls defining said container;

forming a pierceable wall region of predetermined dimensions in said container by urging said forming ram member against a selected semi-solid wall region of the blow-formed container so as to compressively mold from within the blow-formed container a wall region of predetermined dimensions;



filling the blow-formed container with the desired contents through said composite mandrel;

retracting said forming ram member from said selected wall region;

providing forming and sealing means for closing the open end of said confined tube length so as to hermetically seal the filled container;

operating said forming and sealing means to hermetically seal the filled container; and

opening said assembly to remove the filled and hermetically-sealed but pierceable container.

4,176,154

METHOD FOR THERMOFORMING PLASTIC SHEETS

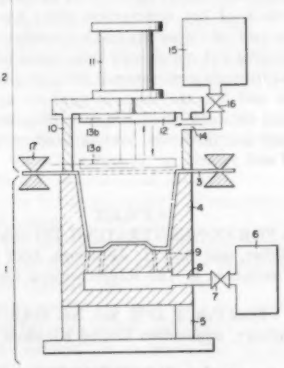
Kyosuke Miki, Yokohama, and Masahiro Takeuchi, Yamato, both of Japan, assignors to Sumitomo Bakelite Company Limited, Tokyo, Japan

Filed May 23, 1977, Ser. No. 799,867

Claims priority, application Japan, May 27, 1976, 51/60595

Int. Cl.[2] B29C *17/03, 17/04*

U.S. Cl. 264—547 **8 Claims**



1. A method for producing a shaped article by thermoforming a thermoplastic resin sheet, which comprises:

heating a thermoplastic polypropylene sheet, having a crystal melting point of Tm, at a temperature ranging from (Tm−10)° C. to (Tm−40)° C.;

fixing said heat-softened thermoplastic polypropylene sheet between a concave forming mold the edge of which defines an open mouth and a concave ancillary mold the edge of which defines an open mouth, said molds being placed mouth to mouth in opposition to one another, and said ancillary mold having a molding assist in the form of a flat plate which is movable by means of a moving mechanism toward and away from the mouth of said ancillary mold;

providing said molding assist in said ancillary mold adjacent the mouth thereof such that the distance between the molding assist surface to be contacted with the sheet and the level of the fixed sheet is 1/10 to ½ of the depth of the shaped article;

introducing a pressurized fluid at a pressure of 1.5 kg/cm^2 to 5 kg/cm^2 into the forming mold to expand the sheet into the ancillary mold thereby contacting first the central part of the sheet with the flat surface of the molding assist and successively increasing the contacting area of the sheet until the peripheral part of the sheet contacts the flat surface of the molding assist;

moving the molding assist backwardly by means of pressure of the pressurized fluid applied to the surface of the molding assist through the sheet from the forming mold side while expanding the sheet into the ancillary mold until the height of the flat surface of the molding assist in contact with the sheet reaches a depth from about ½ to about the same as the depth of the intended shaped article, whereby the peripheral portion of the sheet which is not in contact with the molding assist is stretched and said stretching extends to the central portion of the sheet as the molding assist is so moved backwardly into the concavity of the ancillary mold; and

immediately thereafter introducing a pressurized fluid at a pressure of 1.0 kg/cm^2 to 7.0 kg/cm^2 into the ancillary mold to press the sheet against the interior surface of the forming mold, thereby forming the sheet into the desired shape.

4,176,155

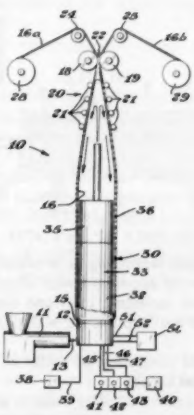
METHOD AND APPARATUS FOR MAKING FILM

Herbert W. Heisterkamp, Cleveland, and Carl B. Havens, Findlay, both of Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 853,615, Aug. 22, 1969, abandoned, which is a continuation of Ser. No. 545,591, Apr. 27, 1966, abandoned. This application Aug. 12, 1974, Ser. No. 496,493

Int. Cl.[2] B29D *23/04;* **B29F** *3/08*

U.S. Cl. 264—564 **7 Claims**



1. Apparatus for the production of thermoplastic seamless tube comprising an extrusion head having an annular extrusion orifice and means centrally located adjacent said extrusion

head for cooling and radially directing cooling gas against the internal surface of continuously extruded thermoplastic tubing said means for cooling and radially directing cooling gas comprising a stationary housing having an elongated chamber therein, said chamber extending in an axial direction with respect to said annular extrusion orifice and having an inlet for the cooling gas at the end opposite said extrusion orifice, means for directing a stream of cooling gas from said inlet through said chamber, cooling means in said chamber for cooling said stream of gas as it passes therethrough, and nozzle means between said stationary housing and said extrusion head, said nozzle means comprising a second housing which is rotatably mounted, said rotatable housing having a further chamber therein having an inlet at one end thereof for receiving said cooling gas from said stationary housing and an annular substantially radially directed outlet passage, said outlet passage being unobstructed whereby upon rotation of said second housing a uniform omni-radial stream of cooling gas is directed against the interior surface of the extruded tube and along a path away from said extrusion head and contiguous to the interior surface of the extruded tube towards said inlet in said chamber of said stationary housing.

3. In a method for producing a thermoplastic seamless tube, the steps comprising

continuously extruding thermoplastic material in the form of seamless tubing,

continuously withdrawing the tubing from the point of extrusion,

directing a cooling gas stream through the extruded tubing in an axial direction opposite to the direction of withdrawal of said tubing towards the point of extrusion,

imparting a helical motion to said stream as said stream moves in said axial direction, and then

directing said stream having a helical flow pattern radially along a path against the interior surface of said tubing and away from said point of extrusion to cool the tubing.

4,176,156
METHOD FOR HEAT-STERILIZING ARTIFICIAL KIDNEYS

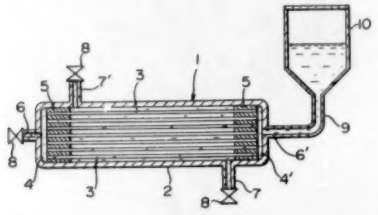
Akira Asanuma; Nobuo Taneda; Ryozo Hasegawa; Shohei Jindai, and Toshio Morishita, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Nov. 1, 1977, Ser. No. 847,619

Claims priority, application Japan, Nov. 5, 1976, 51-132301; Nov. 9, 1976, 51-133738; Nov. 9, 1976, 51-133739; May 25, 1977, 52-66284[U]; May 26, 1977, 52-66912[U]

Int. Cl.[2] **A61M** *1/03;* **A61L** *1/00*

U.S. Cl. 422—25 **10 Claims**



1. A method for heat sterilizing an artificial kidney comprising a receptacle having accommodated therein permselective hollow filaments and including inlet and outlet ports for the blood and inlet and outlet ports for a dialyzate, which comprises

(a) filling a primer consisting of water or a water solution into the artificial kidney,

(b) connecting a pressure buffer tank to at least one of the inlet and outlet ports, a conduit being provided between said at least one port and the pressure buffer tank, one end of the conduit being connected to said at least one port and the other end of the conduit being connected to the pressure buffer tank thereby to connect said at least one port to the pressure buffer tank,

(c) sealing the remaining ports by stopper means,

(d) heating the artificial kidney to a temperature of 80° to 130° C. to heat sterilize it, and moving gas and a part of the primer in the artificial kidney, which have been expanded by the heating, to the pressure buffer tank,

(e) cooling the artificial kidney to return the primer in the buffer tank to the artificial kidney, and

(f) aseptically sealing the port connected to the pressure buffer tank.

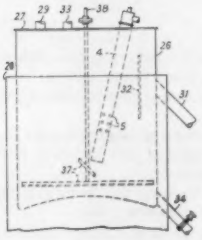
4,176,157
CALCINING CALCIUM SULPHATE DIHYDRATE

James S. George, Brampton; Arthur G. T. Ward, Wilford, and Percy N. Pastakia, Dunkirk, all of England, assignors to BPB Industries Limited, London, England

Division of Ser. No. 708,461, Jul. 26, 1976, abandoned, which is a continuation of Ser. No. 523,936, Nov. 14, 1974, abandoned. This application Aug. 18, 1977, Ser. No. 825,755

Int. Cl.[2] **B01J** *6/00;* **C04B** *11/02*

U.S. Cl. 422—114 **7 Claims**



1. Apparatus for calcining calcium sulfate dihydrate (gypsum) comprising an open-topped, closed-bottom, calcination vessel adapted to contain a mass of calcining gypsum having a lid thereon to close said vessel; a combustion chamber located beneath the closed bottom of said vessel and a heat source means in said combustion chamber to supply heat to the exterior of said vessel; inlet means adapted for feeding raw gypsum into said vessel; a heat-supplying tube mounted in the lid and extending into said vessel, said tube having a closed end, an open end and distribution holes near the open end with said open end and distribution holes placed in the interior of said vessel; a source of hot combustion gases located near the closed end of said tube whereby said hot combustion gases pass through said tube and are directly introduced into the interior of said vessel through said open end and said distribution holes of said tube and into the mass of gypsum; agitation means mounted on a rotatable shaft and extending into said vessel; and a product overflow tube leading from an opening in the side wall of said vessel.

4,176,158
PROCESS FOR CONCENTRATING TECHNETIUM-99M

John B. Laidler, and Roy H. Abrahams, both of Amersham, England, assignors to The Radiochemical Centre Ltd., England

Filed Feb. 3, 1976, Ser. No. 654,877

Claims priority, application United Kingdom, Feb. 3, 1975, 4618/75

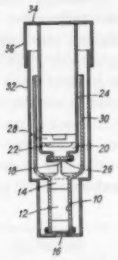
Int. Cl.[2] **C01G** *57/00*

U.S. Cl. 423—2 **9 Claims**

1. A method of increasing the radioactive concentration of technetium-99m in an aqueous solution containing the technetium-99m as pertechnetate ion TcO_4^- which method consists essentially of the steps of:

(1) if the solution is not already acid, acidifying it,

(2) contacting the resulting acid solution with a bifunctional ion-exchange material which is an anion-exchanger under acid conditions and a cation-exchanger under alkaline conditions, the pH of the solution being such that the bifunctional ion exchange material in contact with it acts as an anion-exchanger and adsorbs pertechnetate thereon, and recovering the acid bifunctional ion-exchange material with pertechnetate ion carried thereon and an acid liquid substantially free of pertechnetate ion,



(3) contacting the material resulting from step (2) with an aqueous alkaline liquid, of smaller volume than the aqueous starting solution treated in step (1), the pH of the aqueous alkaline liquid being such that the bifunctional ion-exchange material in contact therewith acts as a cation-exchanger and releases pertechnetate adsorbed thereon, and recovering an aqueous alkaline solution containing pertechnetate ion, and

(4) neutralizing the alkaline solution recovered in step (3) to obtain an aqueous solution containing pertechnetate ion at a higher concentration than the starting material.

4,176,159

PROCESS FOR CONCENTRATION OF TITANIUM CONTAINING ANATASE ORE

Jose Marcio Jardim Paixao, Costa Pinto St., 170, Belo Horizonte, Minas Gerais, and Paulo Ayres Falcao de Mendonca, Eng 2 Eranani Cotrim St., 86 Ap. 104, Rio de Janerio, both of Brazil

Continuation-in-part of Ser. No. 741,625, Nov. 15, 1976, abandoned. This application Jun. 19, 1978, Ser. No. 917,072

Int. Cl.[2] C01G *23/00, 23/04*

U.S. Cl. 423—80 **4 Claims**

1. A process for the concentration of titanium containing anatase ore comprising:

(a) calcining the said anatase ore in a non-reducing atmosphere at a temperature below that of rutilization;

(b) cooling said calcined ore;

(c) reducing the cooled ore in a reducing atmosphere at temperatures between 400° C. and 600° C.;

(d) cooling the reduced ore to below 200° C. in an atmosphere to prevent reoxidation;

(e) subjecting the reduced ore to magnetic separation to produce a concentrated titanium containing non-magnetic fraction;

(f) subjecting the non-magnetic fraction to mineral acid leach to remove additional impurities; and

(g) neutralizing and washing said acid leached fraction to produce a concentrated titanium fraction.

4,176,160

PROCESS FOR PURIFYING A ZINC SULFATE SOLUTION

Engelhard Pavonet, Chockier, Belgium, assignor to Societe de Prayon, Belgium

Continuation-in-part of Ser. No. 500,598, Aug. 26, 1974, abandoned, which is a continuation of Ser. No. 264,563, Jun. 20, 1972, abandoned. This application Mar. 6, 1978, Ser. No. 883,451

Claims priority, application Belgium, Jun. 23, 1971, 104968

Int. Cl.[2] C01G *9/06*

U.S. Cl. 423—104 **16 Claims**

1. A process for the preparation of zinc sulfate solution from roasted zinc bearing ore containing iron which comprises treating said ore in a first stage with sulfuric acid to yield a solution of zinc sulfate mixed with solids containing further zinc sulfate in solution admixed with the solids, adding excess roasted zinc ore to maintain said solution at a pH of about 4 to 5.5, separating the solids from the solution in a second stage by continuously decanting one part of said solution substantially free of solids from the upper portion of a decantation vessel to yield a first solution of zinc sulfate from which zinc is recoverable by further treatment electrolytically, continuously withdrawing the other part of solution rich in solids from the lower portion of said vessel and passing the solution rich in solids to a horizontal plane filter to obtain a filter cake consisting essentially of said solids mixed with further zinc sulfate solution, rapidly washing the filter cake successively with a plurality of continuous countercurrent washings of wash water, separating the zinc sulfate solution from said solids with substantially no hydrolysis insolubilizing zinc in the cake to solid zinc compounds in the filter cake, thus separating and recovering a further solution of zinc sulfate from which zinc is recoverable by further treatment electrolytically.

9. Process for purifying an iron-containing zinc sulfate solution using a continuous planar filter, which comprises precipitating iron from said solution in slurry form at a pH which is maintained lower than 4, said iron being in at least one of the following forms: basic sulfate, jarosite or goethite, filtering said slurry on a planar filter and forming a cake on said planar filter, washing the cake directly on the planar filter at least twofold countercurrently without substantially forming a new slurry by mixing any portion of the cake with any of the wash liquids, and thus freeing the cake from water soluble zinc and copper compounds promptly before hydrolysis thereof insolubilizes said compounds as basic sulfates, whereby the solid residue in the cake does not contains substantially more insoluble zinc content than it contained in the slurry being fed to the filtration.

4,176,161

OXIDATION OVER SYNTHETIC AMORPHOUS SILICAS

Thomas O. Mitchell, Trenton, and Darrell D. Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 738,788, Nov. 4, 1976, abandoned, which is a continuation-in-part of Ser. No. 638,405, Dec. 8, 1975, Pat. No. 4,003,825, which is a division of Ser. No. 450,967, Mar. 14, 1974, Pat. No. 3,983,055. This application Feb. 10, 1978, Ser. No. 876,787

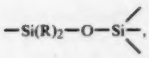
Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—213.5 **17 Claims**

1. An oxidation process comprising contacting an exhaust effluent from an internal combustion engine with a solid catalytic material in the presence of oxygen and under conditions including a temperature from about 150° C. to about 900° C., a pressure of about atmospheric and a gas hourly space velocity, expressed at standard temperature and pressure, of from about 15000 hr^{-1} to about 70,000 hr^{-1}, said solid catalyst material containing a synthetic amorphous solid prepared by the steps of hydrolyzing and polymerizing in the presence of water a silane having the formula $R(Si)X_3$, wherein R is a nonhydro-

lyzable organic group, X is a hydrolyzable group and (Si) is selected from the group consisting of

and



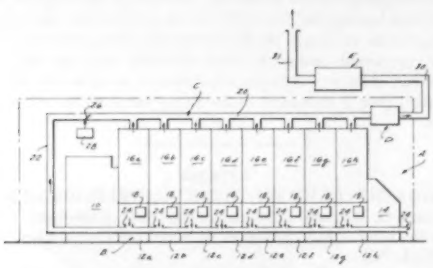
and calcining the polymerized product, said silane being admixed with a second compound, R'_nMY_m, wherein R' is selected from the group consisting of the same groups as R, Y is selected from the group consisting of the same groups as X and oxygen, M is at least one member selected from the group consisting of the elements of Group VIII of the Periodic Table, m is any number greater than 0 and up to 8 and n is from 0 to any number less than 8.

4,176,162

METHOD AND APPARATUS FOR CONSERVATION OF ENERGY IN A THERMAL OXIDATION SYSTEM FOR USE WITH A PRINTING PRESS

Nathan Stern, Caldwell, N.J., assignor to Bobst-Champlain, Inc., Roseland, N.J.

Filed Jul. 11, 1977, Ser. No. 814,145
Int. Cl.[2] B01D *53/34;* F23G *7/06*
U.S. Cl. 423—210 **16 Claims**



11. A method for removing solvents from the dryer exhaust of a printing press or the like comprising the steps of:

heating a bed or ceramic heat exchanger elements having first and second sections;

passing a first portion of the exhaust through each of the first and second sections of the bed in sequence;

passing a second portion of the exhaust through only one of the first and second sections so as to bypass the other section;

regulating the first and second exhaust portions so as to control the degree to which the exhaust is preheated;

introducing the preheated exhaust into an oxidation chamber; and

heating the oxidation chamber to promote oxidation of the exhaust therein.

4,176,163

SODIUM OXIDE FUME FOR SULFUR OXIDE REMOVAL

Hugh W. Nelson, West Hartford, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 12, 1977, Ser. No. 859,764
Int. Cl.[2] C01B *17/00;* B01D *53/34*
U.S. Cl. 423—242 **11 Claims**

1. A method of reducing the sulfur oxide content of flue gases containing sulfur oxides, comprising the steps of:

a. providing a bed consisting essentially of carbonaceous material and sodium carbonate;

b. maintaining a reducing environment and a temperature above approximately 1620° F. (880° C.) in the bed, thereby producing sodium gas that rises from the bed;

c. supplying oxygen to the surface of the bed, thereby allowing the sodium gas to react to produce sodium oxide fume;

d. adding the sodium oxide fume to the flue gas, thereby converting oxides of sulfur to sodium sulfate; and

e. precipitating the sodium sulfate particles from the flue gas.

4,176,164

TREATMENT OF SULFUR OXIDES WITH AQUEOUS GLYOXYLIC ACID SOLUTIONS

William H. Stark, Cincinnati, Ohio, and Cheng-Hsien Chu, Etobicoke, Canada, assignors to Spring Chemicals Limited, Toronto, Canada

Continuation-in-part of Ser. No. 717,082, Aug. 24, 1976, Pat. No. 4,115,517. This application Jul. 26, 1977, Ser. No. 819,136
The portion of the term of this patent subsequent to Sep. 19, 1995, has been disclaimed.
Int. Cl.[2] C01B *17/00;* C01F *11/46*
U.S. Cl. 423—243 **2 Claims**

1. A process for the removal of sulfur dioxide and sulfur trioxide from an industrial gas which process comprises:

(a) passing the industrial gas at a temperature between about 50° C. and about 1000° C. to a cooling zone to cool the gas to a temperature between about 20° C. and about 40° C.;

(b) passing the industrial gas at a temperature between about 20° C. and about 40° C. through an absorption zone in contact with an absorbent composition stream comprising from about 10% to about 25% glyoxylic acid and from about 90% to about 75% water;

(c) absorbing sulfur dioxide and sulfur trioxide in said absorbent composition;

(d) passing the absorbent composition containing absorbed sulfur dioxide and absorbed sulfur trioxide as sulfuric acid to a stripping zone and stripping absorbed sulfur dioxide from the absorbent composition stream;

(e) removing from the stripping zone stripped aqueous glyoxylic acid solution containing sulfuric acid;

(f) removing sulfuric acid from the stripped aqueous glyoxylic acid solution by contacting the solution with a sulfuric acid removing agent; and

(g) passing the aqueous glyoxylic acid solution to the absorption zone of step (b).

4,176,165

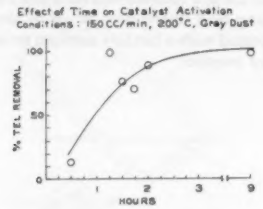
TREATMENT OF ALKYL LEAD-CONTAINING GAS STREAM

William D. Hargett, and Thorowgood T. Broun, both of Beaumont, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 863,275, Dec. 22, 1977, abandoned. This application Nov. 8, 1978, Ser. No. 958,861
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—245 **19 Claims**

1. A method for treating a gaseous stream containing alkyl

lead which comprises contacting the gas stream with at least a catalytic amount of lead dioxide at temperatures in the range



between 60° C. and 225° C. for a time sufficient to reduce the alkyl lead content of the gaseous stream.

4,176,166

PROCESS FOR PRODUCING LIQUID SILICON

Justice N. Carman, Tarzana, Calif., assignor to John S. Pennish, Los Angeles, Calif., as part interest

Filed May 25, 1977, Ser. No. 800,191

The portion of the term of this patent subsequent to Oct. 18, 1994, has been disclaimed.

Int. Cl.[2] C01B *33/02*

U.S. Cl. 423—350 **9 Claims**

1. In a method of producing silicon, the steps of:

maintaining a pool of liquid silicon in a first chamber having an inner wall of silica;

continuously mixing hydrogen and at least one halogenated silane in the gaseous state directly over the pool of liquid silicon;

heating the hydrogen and halogenated silane, with the hydrogen and silane reacting to produce additional liquid silicon in the pool;

maintaining the pool of liquid silicon substantially saturated with oxygen; and

continuously withdrawing liquid silicon from the pool.

4,176,167

PROCESS FOR CONVERTING ALKALI METAL IODATES TO PERIODATES

Robert T. Jernigan, and Byford D. Sheffield, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 19, 1977, Ser. No. 834,608

Int. Cl.[2] C01B *11/22*

U.S. Cl. 423—476 **7 Claims**

1. A process for preparing one or more alkali metal periodates in the tri-, tetra- or pentabasic state from one or more alkali metal iodates which process comprises heating a mixture containing as components

(1) an alkali metal iodate or mixture of such iodates,

(2) an alkali metal hydroxide or mixture of such hydroxides in which the alkali metal portion of such hydroxide or mixtures thereof can be the same as or different from the alkali metal portion of said iodate or mixture thereof;

at a temperature of from about 150° C. to about 600° C. in the presence of at least a stoichiometric quantity of oxygen and less than about 100 moles of water per mole of alkali metal iodate and the molar ratio of component (2): component (1) is from about 0.5:1 to about 10:1.

4,176,168

PROCESS FOR PRODUCING CHLORINE DIOXIDE

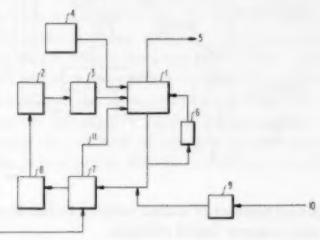
Nobutaka Goto, Tokyo, Japan, assignor to Chlorine Engineers Corp., Ltd., Tokyo, Japan

Filed Jun. 1, 1978, Ser. No. 911,548

Claims priority, application Japan, Jun. 8, 1977, 52-66607

Int. Cl.[2] C01B *11/02*

U.S. Cl. 423—478 **9 Claims**



1. A process for producing chlorine dioxide which comprises

(1) feeding hydrochloric acid and an excess on a stoichiometric basis of sodium chlorate produced in an electrolytic cell for producing sodium chlorate into a reaction zone for producing chlorine dioxide;

(2) reacting the hydrochloric acid and the sodium chlorate in the reaction zone at a temperature of about 65° to about 80° C. under a reduced pressure of about 100 to about 700 mmHg to form a gaseous reaction product containing chlorine dioxide and chlorine and so that sodium chloride produced is precipitated to form a slurry-like residual reaction mixture containing the precipitated sodium chloride;

(3) continuously removing the chlorine dioxide as the gaseous reaction product;

(4) simultaneously withdrawing the slurry-like residual reaction mixture containing the precipitated sodium chloride continuously from the reaction zone;

(5) feeding water to the thus withdrawn residual reaction mixture to dissolve the sodium chloride and form a solution containing sodium chloride;

(6) blowing air or an inert gas through the solution containing sodium chloride to remove any residual chlorine dioxide and chlorine from the solution;

(7) recycling the chlorine dioxide and chlorine removed from the solution to the reaction zone through an equalizing line; and

(8) then recycling the solution to an electrolytic cell for the production of sodium chlorate.

4,176,169

METHOD OF EXTRACTING IODINE FROM LIQUID MIXTURES OF IODINE, WATER AND HYDROGEN IODIDE

Karol J. Mysels, La Jolla, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Jul. 3, 1978, Ser. No. 921,435

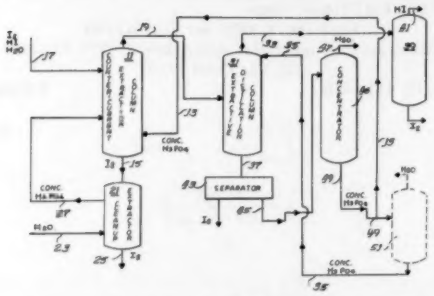
Int. Cl.[2] C01B *17/14*

U.S. Cl. 423—501 **13 Claims**

1. A process for separating the components of a liquid solution containing more than 50 w/o iodine plus HI and water wherein much of said iodine may be complexed with the HI in the form of hydrogen polyiodides, which process comprises

continuously treating said liquid solution by countercurrent extraction, at a temperature sufficient to maintain iodine in liquid form, with phosphoric acid containing an equivalent weight percent of H_3PO_4 of at least about 90 w/o to produce two continuous streams, a bottom stream which is generally completely molten iodine dissociated from

any hydrogen polyiodide complexes and an overhead stream containing water, HI, H_3PO_4 and no more than a



minor amount of iodine relative to the amount of iodine in said original liquid solution.

4,176,170

TERNARY IONIC CONDUCTORS

Horst M. Kasper, Warren; Benjamin Tell, Matawan, and Sigurd Wagner, Holmdel, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 783,649, Apr. 1, 1977, Pat. No. 4,115,633. This application Jul. 13, 1978, Ser. No. 924,188

Int. Cl.[2] H01M *6/18*; C01B *19/00*

U.S. Cl. 423—508 **5 Claims**

1. The composition represented by the formula AB_5C_8 wherein A is a metallic atom with atomic number no greater than 55 which has a +1 oxidation state, B is a group III A metallic atom, and C is a group VI A atom.

4,176,171

HIGH PORE VOLUME ALUMINA FROM DILUTE HIGH INJECTION ALKOXIDE FEED

Larry L. Bendig, Ponca City, Okla.; John F. Scamehorn, Austin, Tex., and Donald E. Stowell, Ponca City. Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Aug. 14, 1978, Ser. No. 933,310

Int. Cl.[2] C01F *7/02*

U.S. Cl. 423—628 **4 Claims**

1. An improved method for producing alumina having from about 25 to about 60% of the total pore volume of the alumina from about 1,000 to about 10,000 angstroms from the water hydrolysis of aluminum alkoxides, the improvement comprising diluting the aluminum alkoxide with from about 20% to about 70% by weight with an alkanol containing from about 2 to about 8 carbon atoms, then injecting the diluted aluminum alkoxides into a hydrolysis reactor at velocities greater than 40 feet per second, said velocity defined by the formula $V=F/PA$ wherein V is velocity in feet per second, F is the rate of flow as pounds per second of dilute feed, P is density in pounds per cubic foot, and A is the orifice area in square feet.

4,176,172

PARTICLE GAMMA FERRIC OXIDE

Leonard M. Bennetch; Harry S. Greiner, both of Bethlehem; Kenneth R. Hancock, Easton, all of Pa., and Mark Hoffman, Phillipsburgh, N.J., assignors to Pfizer Inc., New York, N.Y.

Continuation of Ser. No. 643,346, Dec. 22, 1975, abandoned, which is a division of Ser. No. 370,635, Jun. 18, 1973, abandoned, which is a division of Ser. No. 225,636, Feb. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 125,331, Mar. 17, 1971, abandoned. This application Nov. 28, 1977, Ser. No. 855,430

Int. Cl.[2] C01G *49/06*

U.S. Cl. 423—634 **1 Claim**

1. Synthetic magnetic gamma ferric oxide in the form of very fine-grained, needle-like crystalline particles having a length to width ratio of up to about 20:1 and a length up to about 2 microns, said ferric oxide providing an orientation ratio of at least 2.4 in a 1000 oersted field and a half peak width of the switching field distribution of up to about 79 oersteds when incorporated with a binding medium to form a magnetic impulse record member.

4,176,173

RADIOGRAPHIC COMPOSITIONS

Harry S. Winchell, Lafayette; Tz-Hong Lin, Fremont, and Charles A. Panneciere, Alemeda, all of Calif., assignors to Medi-Physics, Inc., Emeryville, Calif.

Filed Jul. 18, 1977, Ser. No. 816,618

Int. Cl.[2] A61K *29/02*

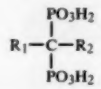
U.S. Cl. 424—5 **6 Claims**

1. A method of preparing a patient for radiographic examination of the gastrointestinal tract which comprises orally administering to said patient an amount of a composition comprising an aqueous solution of a stable, non-toxic, hydrated complex of a metal selected from the group consisting of hafnium and tantalum and an organic acid complexing agent selected from the group consisting of:

(a) an organic acid containing from 2 to 7 carbon atoms and at least one hydroxyl group;

(b) an amino acid containing from 2 to 7 carbon atoms: and

(c) a phosphonic acid selected from the group consisting of ethylenediaminetetramethylenephosphonic acid, diethylenepentamethylenephosphonic acid and diphosphonic acids represented by the formula



wherein R_1 and R_2 are the same or different and are selected from the group consisting of hydrogen, lower alkyl, amino, halogen, hydroxyl and $—CH_2—COOH$

and pharmaceutically acceptable salts thereof, said salts being selected from the group consisting of the ammonium salt, the sodium salt and the potassium salt, said composition containing from about 1% to about 25% weight to volume of said metal, effective for said examination.

4,176,174

VIRAL ANTIBODY DIAGNOSTIC TEST SYSTEM

Stuart M. Russell, Bromley, and Leonard W. J. Bishop, Beaconsfield, both of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 596,989, Jul. 18, 1975, abandoned. This application Sep. 27, 1978, Ser. No. 946,439

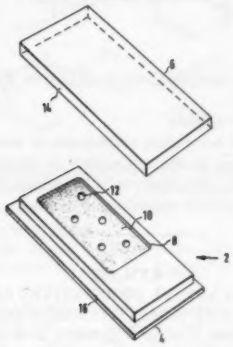
Claims priority, application United Kingdom, Jul. 19, 1974, 32050/74

Int. Cl.[2] G01N *31/00, 31/14, 33/16*

U.S. Cl. 424—8 **2 Claims**

1. A specific viral antibody detecting diagnostic system suitable for measuring the amount of antibodies in a test fluid comprising a layer of gel from 0.1 to 5 mm thick, which contains:

(a) intact erythrocytes having appropriate viruses adhering to the surface thereof;
(b) an erythrocyte preservative;



(c) a bacteriocidal/fungicidal agent; and wherein one or more wells are cut in the gel for receiving test fluid.

4,176,175

SUGAR-COATED SOLID DOSAGE FORMS

Hideyuki Maekawa, Osaka; Kinzaburo Noda, Itami, and Noboru Hoshi, Higashikurume, all of Japan, assignors to Shionogi & Co., Ltd., Osaka and Shin-Etsu Chemical Co., Ltd., Tokyo, both of, Japan

Filed Jun. 6, 1977, Ser. No. 803,853
Claims priority, application Japan, Jun. 9, 1976, 51-67918
Int. Cl.[2] A61K *9/36*
U.S. Cl. 424—35 **15 Claims**

1. A sugar-coated solid dosage form comprising at least one coating layer formed in direct contact with the surface of the solid dosage form and containing from 0.5 to 25% by weight of a hydroxypropylcellulose having hydroxypropoxy groups in an amount ranging from 4 to 16% by weight.

4,176,176

HAIR SHAMPOO AND CLEANSER COMPOSITIONS

John A. Cella, Plandome Mills, N.Y., and August E. Fiebig, Jr., Chicago, Ill., assignors to Alberto-Culver Company, Melrose Park, Ill.

Filed May 31, 1974, Ser. No. 474,955
Int. Cl.[2] A61K *7/06*
U.S. Cl. 424—70 **6 Claims**

1. A hair shampoo in liquid or paste form for use on human hair attached to the human head which includes a water carrier, a non-perfluorinated water-soluble quaternary ammonium compound detergent, and which contains, as an additional ingredient thereof, a hydrophobic-lipophobic compound of anionic, cationic, nonionic or amphoteric character, corresponding to the formula

$$CF_3—(CF_2)_x—(CH_2)_y—Z$$

where Z is a member selected from the class consisting of a water-solubilizing group and an oil-solubilizing group, x is an integer from 2 to 17, and y is an integer from 0 to 4, said compound being present in proportions, based on the weight of the shampoo, in the range of about 0.5% to about 2%, said compound being present in proportions less than the proportions of said detergent.

4,176,177

INHIBITION OF BONE RESORPTION

Klaus E. Kuettner, Chicago, Ill., assignor to Rush-Presbyterian-St. Luke's Medical Center, Chicago, Ill.

Filed Nov. 16, 1978, Ser. No. 961,296
Int. Cl.[2] A61K *35/24, 35/44, 35/32*
U.S. Cl. 424—95 **10 Claims**

1. A method for regulating bone resorption comprising exposing the bone to an effective amount of a composition of matter obtained from avascular or poorly vascularized tissue by extracting the tissue with an aqueous extraction medium which includes a solute which does not irreversibly denature the proteinaceous matter to be extracted, separating the resultant aqueous extract from the tissue, recovering from the aqueous extract substances having a molecular weight below about 50,000, and treating the fraction of aqueous extract having a molecular weight below about 50,000 to remove salts therefrom.

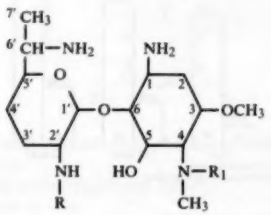
4,176,178

2-DEOXY-2'-N-ACYL AND ALKYL FORTIMICINS A AND B

Jerry R. Martin; John S. Tadanier, both of Waukegan, and Paulette Collum, Zion, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.,

Filed Dec. 21, 1977, Ser. No. 863,011
Int. Cl.[2] A61K *31/71;* C07H *15/22*
U.S. Cl. 424—180 **12 Claims**

1. A compound of the formula:



wherein: R is acyl, aminocyl, N-monoloweralkylaminoacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, an amino acid residue, loweralkyl, aminoloweralkyl, hydroxyloweralkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylaminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, or N,N-diloweralkylaminohydroxyloweralkyl; and R_1 is acyl, aminoacyl, N-monoloweralkylaminoacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, an amino acid residue, loweralkyl, aminoloweralkyl, hydroxyloweralkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylaminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, N,N-diloweralkylaminohydroxyloweralkyl or hydrogen and wherein acyl is represented by the formula

Y being loweralkyl; and the pharmaceutically acceptable salts thereof.

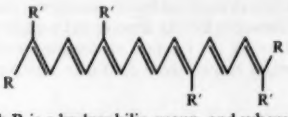
12. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier or diluent.

4,176,179
METHOD FOR TREATING ARTHRITIS

John L. Gainer, Charlottesville, Va., assignor to The University of Virginia Alumni Patents Foundation, Charlottesville, Va.

Filed Apr. 17, 1978, Ser. No. 897,002
Int. Cl.[2] A61K *31/13, 31/19, 31/23, 31/70*
U.S. Cl. 424—180 4 Claims

1. A method for treatment of rheumatoid arthritis in a mammal which comprises administering to said mammal in need of treatment an effective dose sufficient to alleviate the symptoms of rheumatoid arthritis, of a water soluble carotenoid having the formula

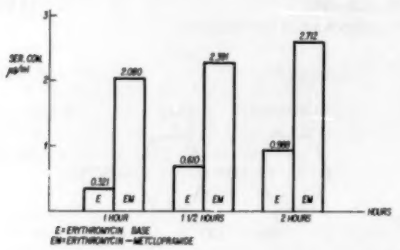


wherein each R is a hydrophilic group, and wherein each R′ is hydrogen or methyl.

4,176,180
PHARMACEUTICAL COMPOSITION COMPRISING ERYTHROMYCIN AND METOCLOPRAMIDE AND METHOD OF PREPARING SAME

Pierre Barbier, Paris, France, assignor to Societe d'Etudes Scientifiques et Industrielles, Paris, France

Filed Jun. 1, 1978, Ser. No. 911,611
Claims priority, application United Kingdom, Jun. 3, 1977, 23727/77
Int. Cl.[2] A61K *31/71, 31/165*
U.S. Cl. 424—181 6 Claims



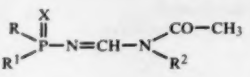
6. A method of suppressing inactivation of erythromycin by gastric acidity and increasing the total amount of erthromycin absorbed in a human following oral administration of erythromycin to said human, said method comprising orally administering an effective amount of a pharmaceutical composition comprising 60 parts by weight of erythromycin per part by weight of metoclopramide or the equivalent amount, in the form of the base, of a therapeutically acceptable salt thereof.

4,176,181
COMBATING PESTS WITH N-(AMINOMETHYLENE)-(MONOTHIO AND DITHIO)-PHOSPHORIC ACID DIESTER-AMIDES

Hellmut Hoffmann, Wuppertal; Ingeborg Hammann, Cologne, and Bernhard Homeyer, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 4, 1978, Ser. No. 931,046
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1977, 2737403
Int. Cl.[2] A01N *9/36;* C07F *9/24*
U.S. Cl. 424—211 10 Claims

1. An N-(aminomethylene)-(monothio and dithio)-phosphoric acid diester-amide of the formula



wherein

R and R^1 each independently is alkoxy or alkylthio,

R^2 is alkyl, and

X is oxygen or sulphur.

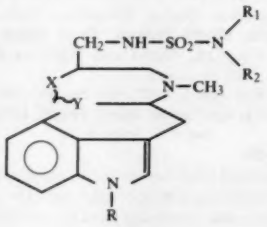
2. A method of combating arthropods or nematodes which comprises applying to the arthropods or nematodes, or to a habitat thereof, an arthropodicially or nematicidally effective amount of a compound according to claim 1.

4,176,182
SULFAMOYL DERIVATIVES OF 8-β-AMINOMETHYLERGOLINE

Giorgio Ferrari, and Vittorio Vecchietti, both of Milan, Italy, assignors to SIMES Societa Italiana Medicinali e Sintetici S.p.A., Milan, Italy

Filed Nov. 3, 1977, Ser. No. 848,530
Claims priority, application Italy, Nov. 24, 1976, 29704 A/76
Int. Cl.[2] C07D *457/02;* A61K *31/48*
U.S. Cl. 424—248.5 18 Claims

1. Sulfamoyl compounds of 8-β-aminoemethylergoline having the formula:



wherein

x~y is CH=C or CH_2—CH

R is hydrogen, C_1–C_3 alkyl, C_3–C_5 alkenyl or C_3–C_4 alkyne,

R_1=R_2=C_1–C_3 alkyl, or R_1 and R_2 are connected to each other to form a ring with the adjacent nitrogen atom which ring is the piperazino, piperidino, morpholino, pyrrolidino, or hexahydroazepino group.

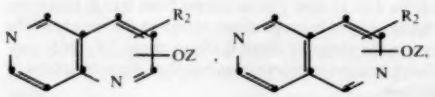
14. Pharmaceutical compositions, useful as anti-migrainic, anti-hypertensive and psychopharmaceutically active drugs, characterized in that they contain, as the active ingredient, a compound according to claim 1 and the pharmaceutically acceptable salts thereof with non toxic, organic or inorganic acids.

4,176,183
NOVEL NAPHTHYRIDINES

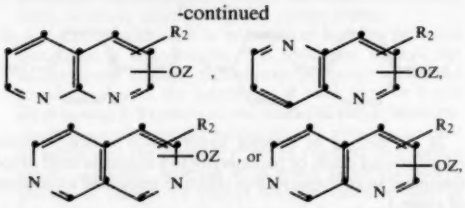
John J. Baldwin, and Gerald S. Ponticello, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 792,752, May 2, 1977, abandoned. This application Jul. 17, 1978, Ser. No. 925,577
Int. Cl.[2] A61K *31/44;* C07D *221/00*
U.S. Cl. 424—248.52 25 Claims

1. A compound having the formula



-continued



and pharmaceutically acceptable salts thereof wherein

Z is $—CH_2—CHOR—CH_2—NHR_1$ wherein

R is hydrogen or C_2–C_{12} acyl and

R_1 is C_1–C_{12}alkyl, and

R_2 is H, Cl, Br, F, CN, $—NH_2$, NO_2, CF_3,

$—COOR_4$ wherein R_4 is H, C_1–C_6alkyl or C_6–C_{12}carbocyclic aryl,

$—CONR_5R_6$ wherein R_5 and R_6 when separate, are H or C_1–C_6alkyl and when joined, are $—CH_2—(CH_2)_3—CH_2$, $—CH_2—CH_2—O—CH_2—CH_2—$, $—CH_2—CH_2—NH—CH_2—CH_2—$, or $—CH_2—CH_2—N(CH_3)—CH_2—CH_2—$, $—C_1$–C_6alkylthio, $—C_1$–C_6 alkylsulfinyl or $—C_1$–C_6alkylsulfonyl.

22. A pharmaceutical composition useful for effecting β-adrenergic blockade or treating hypertension containing an effective amount of a compound of claim **1**.

4,176,184

IMIDAZOISOQUINOLINE-DIONES AND SALTS THEREOF

Volkhard Austel; Eberhard Kutter, both of Biberach; Joachim Heider, Warthausen; Wolfgang Eberlein, Biberach, all of Fed. Rep. of Germany; Walter Kobinger; Christian Lillie, both of Vienna, Austria; Willi Diederen, and Walter Haarmann, both of Biberach, Fed. Rep. of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Fed. Rep. of Germany

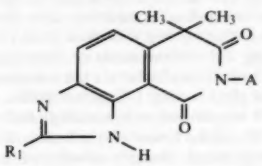
Filed Jul. 17, 1978, Ser. No. 925,461

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1977, 2732906; Jul. 21, 1977, 2732951

Int. Cl.[2] **A61K** *31/535;* **C07D** *471/04*

U.S. Cl. 424—248.52 **12 Claims**

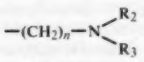
1. A compound of the formula



wherein

R_1 is lower alkyl of 1 to 6 carbon atoms; phenyl-lower alkyl; cycloalkyl of 3 to 6 carbon atoms; phenyl; or mono- or di-substituted phenyl, where the substituents are each halogen, hydroxyl or methoxy, or one of them is methyl-mercapto, methylsulfinyl, methylsulfonyl or benzyloxy or both are identical methyl-mercapto, methylsulfinyl, methylsulfonyl or benzyloxy groups; and

A is hydrogen or



where

R_2 is hydrogen or lower alkyl;

R_3 is lower alkyl of 1 to 6 carbon atoms or dimethoxyphenyl-lower alkyl; or

R_2 and R_3, together with each other and the nitrogen atom to which they are attached, are piperidino, morpholino or N'-lower alkyl-piperazino; and

n is 2 or 3;

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,176,185

SPIRO-QUINOLYLHYDANTOINS

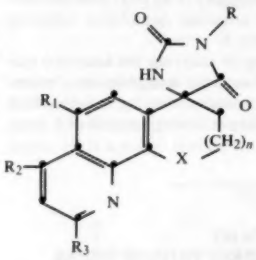
Rodney C. Schnur, Noank, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jan. 22, 1979, Ser. No. 5,278

Int. Cl.[2] **C07D** *491/20;* **A61K** *31/47;* **C07D** *513/20*

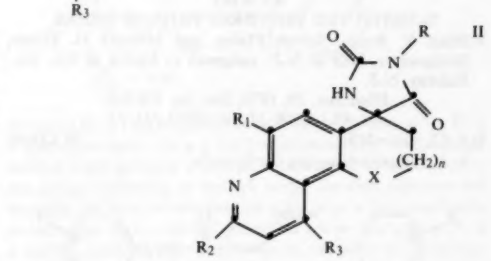
U.S. Cl. 424—258 **17 Claims**

1. A compound selected from the formulae



I

and



II

and the base salts thereof with pharmaceutically acceptable cations, wherein

X is selected from oxygen and sulfur;

n is zero, one or two;

R is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms and benzyl;

and R_1, R_2 and R_3 are each selected from the group consisting of hydrogen, chloro, bromo, fluoro and alkyl of 1 to 3 carbon atoms.

15. A method of treating a diabetic host for diabetic cataracts, neuropathy or retinopathy which comprises administering to said host an effective amount of a compound of claim **1**.

4,176,186

QUATERNARY DERIVATIVES OF NOROXYMORPHONE WHICH RELIEVE INTESTINAL IMMOBILITY

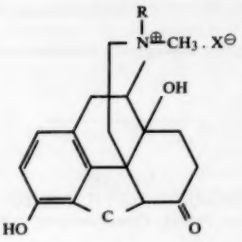
Leon I. Goldberg, Chicago, Ill.; Herbert Merz, Ingelheim am Rhein, and Klaus Stockhaus, Bingen, both of Fed. Rep. of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Fed. Rep. of Germany

Filed Jul. 28, 1978, Ser. No. 928,821

Int. Cl.[2] **A61K** *41/485;* **C07D** *489/00*

U.S. Cl. 424—260 **4 Claims**

1. A compound of the formula



wherein

R is allyl, chloroallyl, cyclopropylmethyl or propargyl; and

X is a chloride, bromide, iodide, or methylsulfate anion.

3. An intestinal immobility relieving pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective intestinal immobility relieving amount of a compound of claim 1.

4. The method of preventing or relieving the intestinal mobility inhibiting side-effect of narcotic analgesics in a warm-blooded animal, which comprises administering to said animal an effective intestinal immobility relieving amount of a compound of claim 1.

4,176,187

SUBSTITUTED DIHYDROPYRIDINE UREAS

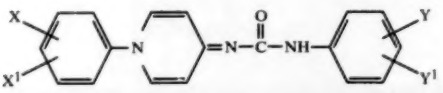
William V. Ruyle, Scotch Plains, and Michael H. Fisher, Bridgewater, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 29, 1978, Ser. No. 920,528

Int. Cl.[2] A61K *31/44*; C07D *213/75*

U.S. Cl. 424—263 **26 Claims**

1. A compound having the formula



and pharmaceutically acceptable salts thereof wherein

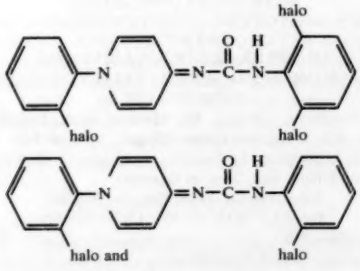
X is H, C_1–C_6 alkyl, CN, halo, SR or —OR wherein R is C_1–C_6 alkyl,

X^1 is H, C_1–C_6 alkyl, CN, halo, SR^1 or OR^1 wherein R^1 is C_1–C_6 alkyl,

Y is H, halo, C_1–C_6 alkyl, CN, CF_3, NO_2, $COOC_1$–C_6 alkyl, NR^2R^3 wherein R^2 and R^3 are H or C_1–C_6 alkyl, SR^4, SOR^4, SO_2R^4 or OR^4 wherein R^4 is C_1–C_6 alkyl and

Y^1 is H, halo, C_1–C_6 alkyl, CN, CF_3, NO_2, $COOC_1$–C_6 alkyl, NR^2R^3 wherein R^2 and R^3 are H or C_1–C_6 alkyl, SOR^4, SO_2R^4 or OR^4 wherein R^4 is C_1–C_6

excluding compounds having the formulae:



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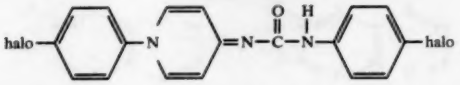


24. A method of treating hypertension which comprises administering orally or parenterally to a human in need of such treatment an antihypertensive effective amount of a compound of claim 1.

4,176,188

UTERO-EVACUANTS

Ramesh M. Kanojia, Somerville; Michael P. Wachter, Bloomsbury, and Robert H. K. Chen, Belle Mead, all of N.J., assignors to Ortho Pharmaceutical Corp., Raritan, N.J.

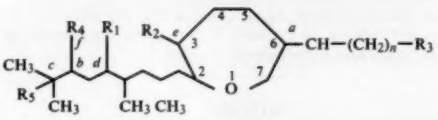
Division of Ser. No. 742,940, Nov. 18, 1976, Pat. No. 4,102,895. This application May 8, 1978, Ser. No. 903,456

Int. Cl.[2] A61K *31/335*

U.S. Cl. 424—270 **19 Claims**

1. A compound selected from the group consisting of:

I



wherein R_1 and R_2 are each —XY wherein X is hydrogen or hydroxy provided that when X is hydrogen, Y is hydrogen; methyl; hydroxy; lower alkoxy; cycloalkoxy; phenoxy; substituted phenoxy wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; trialkylsilyloxy; —OCOR′ wherein R′ is lower alkyl, cycloalkyl, phenyl, and substituted phenyl wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; a sulfate, nitrate or phosphate radical; thiol; alkylthio; phenylthio and substituted phenylthio wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; halo; amino; alkylamino; dialkylamino; phenylamino and substituted phenylamino wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; and the quaternary ammonium and acid addition salts thereof; acylamino wherein the acyl group is derived from a lower alkanoic acid having 1–8 carbon atoms or from benzoic acid or substituted benzoic acid wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; —O-CONHR wherein R is hydrogen or lower alkyl; and when X is hydroxy, Y is cyano; lower alkyl; lower alkenyl; lower alkynyl; propadienyl; benzyl, substituted benzyl wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; phenyl; substituted phenyl wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; provided that when d or e is unsaturated R_1 and R_2 are either X or Y; and $R_1$and/or R_2 are oxo; thioxo; hydroxyimino; alkoxyimino; phenyloxyimino and substituted phenyloxyimino wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; acyloxyimino wherein the acyl group is derived from a lower alkanoic acid having 1–8 carbon atoms or from benzoic acid or substituted benzoic acid wherein the substituent is nitro, halo, or lower alkyl having 1–5 carbon atoms; hydrazono; alkylhydrazono; phenylhydrazono or substituted phenylhydrazono wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; phenylsulfonylhydrazono or substituted phenylsulfonylhydrazono wherein the substituent is halo, nitro, or lower alkyl having 1–5 carbon atoms; carbamoylhydrazono; ethylenedioxy; ethylenedithio; ethylenethiooxy; dialkoxy; thiazolidinyl; methylenyl; alkylidenyl; alkylimino; or phenylamino and

substituted phenylamino wherein the substituent is halo, nitro, or lower alkyl having 1–5 carbon atoms;

R_3 is —CHXY wherein X is hydrogen or hydroxy provided that when X is hydrogen, Y is hydrogen, methyl, hydroxy; lower alkoxy; cycloalkoxy; phenoxy; substituted phenoxy wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; trialkylsilyloxy; heterocycloalkyloxy wherein the hetero atom is nitrogen, oxygen or sulfur and the cycloalkyl group contains 4–5 carbon atoms; —OCOR′ wherein R′ is lower alkyl, cycloalkyl, phenyl, or substituted phenyl wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; a sulfate, nitrate or phosphate radical; thiol; lower alkylthio; phenylthio or substituted phenylthio wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; halo; amino; lower alkylamino; lower dialkylamino; phenylamino or substituted phenylamino wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; and the quaternary ammonium and acid addition salts thereof, acylamino wherein the acyl group is derived from a lower alkanoic acid having 1–8 carbon atoms or from benzoic acid or substituted benzoic acid wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; —OCONHR wherein R is hydrogen or lower alkyl; and when X is hydroxy, Y is cyano; lower alkyl; lower alkenyl; lower alkynyl; propadienyl; benzyl, substituted benzyl wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; phenyl; substituted phenyl wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; and R_3 is —CHZ wherein Z is oxo, thioxo; hydroxyimino; lower alkoxyimino; phenyloxyimino or substituted phenyloxyimino wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; acyloxyimino wherein the acyl group is derived from a lower alkanoic acid having 1–8 carbon atoms and benzoic acid or substituted benzoic acid wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; hydrazono; lower alkylhydrazono; lower dialkylhydrazono; phenylhydrazono or substituted phenylhydrazono wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; phenylsulfonylhydrazono or substituted phenylsulfonylhydrazono wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; carbamoylhydrazono; ethylenedioxy; ethylenedithio; ethylenethiooxy; lower dialkoxy; thiazolidinyl; methylenyl; lower alkylidenyl; lower alkylimino; or phenylimino or substituted phenylimino wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; and R_3 is carboxy; —COOR′ wherein R′ is lower alkyl, cycloalkyl, phenyl or substituted phenyl wherein the substituent is nitro, halo or lower alkyl having 1–5 carbon atoms; —COR″ wherein R″ is amino, lower alkylamino, lower dialkylamino, phenylamino or substituted phenylamino wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; halo; hydrazino, lower alkylhydrazino, lower dialkylhydrazino, phenylhydrazino and substituted phenylhydrazino wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; phenylsulfonylhydrazino and substituted phenylsulfonylhydrazino wherein the substituent is halo, nitro or lower alkyl having 1–5 carbon atoms; cyano; and ammonium, alkali metal and alkaline earth metal salts thereof where R_3 is carboxy;

R_4 is hydrogen; methyl or methylenyl;

R_5 is hydrogen; hydroxy; hydroperoxy or —OCOR‴ wherein R‴ is lower alkyl;

and n is an integer from 0–5, provided that C_3 does not have the R configuration and the orientation at the a double bond does not have the E configuration when n=0, a and c are unsaturated, b, d, e and f are saturated, R_1 is oxo, R_2 is —XY wherein X and Y are hydrogen and hydroxy, R_3 is —CH_2OH and R_4 is hydrogen and when n=0, a and b are unsaturated, c, d, e and f are saturated, R_1 is oxo, R_2 is —XY wherein X and Y are hydrogen and hydroxy, R_3 is —CH_2OH, R_4 is methyl and R_5 is hydrogen.

18. A method of interrupting preqnancy which comprises administering to female animals a compound of claim **1** in an amount sufficient to interrupt pregnancy.

4,176,189

INSECTICIDAL AND ACARICIDAL HYDANTOIN N-METHYLOL ESTERS

Nobushige Itaya, Nishinomiya, and Masachika Hirano, Ibaraki, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

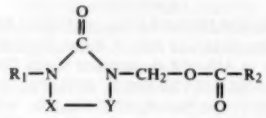
Filed May 24, 1978, Ser. No. 909,107

Claims priority, application Japan, Jun. 20, 1977, 52-73721

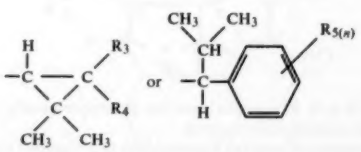
Int. Cl.[2] **A61K** *31/415;* **C07D** *233/72, 405/12*

U.S. Cl. 424—273 R **29 Claims**

1. A compound represented by the formula,



wherein one of X and Y is a carbonyl group and the other is a methylene, ethylidene or propylidene group, R_1 is a lower alkyl, lower alkenyi or lower alkynyl having up to 3 carbon atoms, R_2 is a group represented by the formula,



in which R_3 is a hydrogen atom or a methyl group; when R_3 is a hydrogen atom, R_4 is a methoxyiminomethyl or 2,2-disubstituted vinyl group in which substituents can be selected from the group consisting of methyl, vinyl, fluorine, chlorine and bromine, or both of substituents may form a tetramethylene chain; when R_3 is a methyl group, R_4 is a methyl group; R_5 is a methyl, methoxy, fluorine, chlorine, bromine or 3,4-methylenedioxy group; and n is 1 or 2.

27. An insecticidal and acaricidal composition comprising an inert carrier and as the active ingredient an insecticidally and acaricidally effective amount of a compound according to claim **1**.

4,176,190

DIURETIC AND SALIURETIC SULPHAMOYLBENZOIC ACIDS

Ernst Habicht, Oberwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

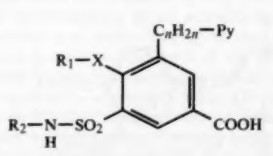
Filed Dec. 14, 1977, Ser. No. 860,533

Claims priority, application Switzerland, Dec. 24, 1976, 16309/76

Int. Cl.[2] **A61K** *31/40;* **C07D** *207/32*

U.S. Cl. 424—274 **10 Claims**

1. A 4-substituted 3-sulphamoyl-5-pyrrolylalkylbenzoic acid of the formula I



(I)

in which R_1 is phenyl or phenyl substituted by lower alkyl,

lower alkoxy, halogeno, trifluoromethyl and/or amino, X is oxygen or sulphur, R_2 is hydrogen, lower alkyl, lower alkoxymethyl or R_1, Py is 1-pyrrolyl or 1-pyrrolyl substituted by lower alkyl and n is an integer from 1 to 4; or a therapeutically useful, non-toxic salt thereof.

9. A diuretic pharmaceutical formulation containing a diuretically effective amount of a compound of of the formula I claimed in claim **1**, together with a pharmaceutically usable excipient.

10. The method of treating high blood pressure of edema in mammals, which comprises administering to said mammals enterally or parenterally an effective amount of a compound of the fc .nula I claimed in claim **1**, as diuretic acid saluretic agent.

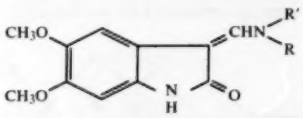
4,176,191

AMINOMETHYLENE OXINDOLES

Martin Winn, Deerfield, and John J. Kyncl, Lake Forest, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

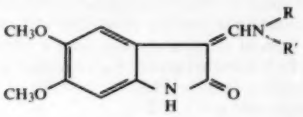
Division of Ser. No. 830,722, Sep. 6, 1977, Pat. No. 4,145,422.
This application Nov. 6, 1978, Ser. No. 958,272
Int. Cl.[2] **A61K** *31/40;* **C07D** *209/34*
U.S. Cl. 424—274 **9 Claims**

1. A compound represented by the formula



wherein R is H; R′ is aralkyl; and the pharmaceutically acceptable acid addition salts thereof.

7. A method of treating hypertension in a mammal comprising administering to a mammal so afflicted, a therapeutically effective amount of a compound represented by the formula



wherein R is H; R′ is aralkyl; and the pharmaceutically acceptable acid addition salts thereof.

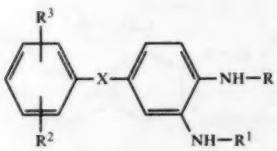
4,176,192

SUBSTITUTED PHENYLGUANIDINES AND PROCESS FOR THEIR MANUFACTURE

Heinz Loewe, Kelkheim; Josef Urbanietz, Schwalbach; Dieter Duwel, Hofheim, and Reinhard Kirsch, Niederjosbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

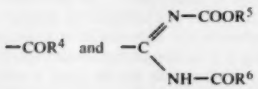
Filed Feb. 25, 1977, Ser. No. 772,234
Claims priority, application Fed. Rep. of Germany, Feb. 28, 1976, 2608238
Int. Cl.[2] **A61K** *31/27;* **C07C** *143/68*
U.S. Cl. 424—300 **9 Claims**

1. A substituted phenylguanidine of the general formula:



in which

R and R_1 are different and each represent one of the radicals



R^4 is a radical selected from alkyl of 1 to 6 carbons, cycloalkyl of 3 to 10 carbons, carbocyclic aryl of 6 to 10 carbons, amino, alkoxy of 1 to 4 carbons, carbocyclic aralkyl with 6 to 10 carbons in the aryl moiety, and the alkyl radical may be substituted by methoxy,

R^5 is alkyl of 1 to 6 carbons,

R^6 is hydrogen or a radical selected from alkyl of 1 to 6 carbons, cycloalkyl of 3 to 10 carbons, alkoxy of 1 to 4 carbons, carbocyclic aryl of 6 to 10 carbons, and carbocyclic aralkyl with 6 to 10 carbons in the aryl moiety,

R^2 and R^3 may be different and are selected from hydrogen, alkoxy of 1 to 4 carbons, halogen, trifluoromethyl, alkyl of 1 to 4 carbons and CN, and

X is the group —O—SO_2— or —SO_2O—.

6. A pharmaceutical composition for treating helmintic infections in mammals containing as the active ingredient an effective amount of a substituted phenylguanidine as claimed in claim **1**, in admixture with a pharmaceutically suitable carrier.

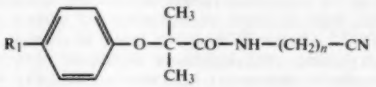
4,176,193

THERAPEUTIC ISOBUTYRAMIDES

André Esanu, Paris, France, assignor to Societe d'Etudes de Produits Chimiques, Paris, France

Continuation of Ser. No. 778,729, Mar. 17, 1977, abandoned.
This application Nov. 17, 1978, Ser. No. 962,129
Int. Cl.[2] **A01N** *9/20;* **C07C** *121/78*
U.S. Cl. 424—304 **1 Claim**

1. A method of treating hyperlipemia, hypertriglyceridemia and hypercholesterodemia comprising the administration in a pharmaceutically acceptable carrier of an effective amount of a compound having the formula:



wherein:

R_1 is a halogen

n is an integer from 2 to 6.

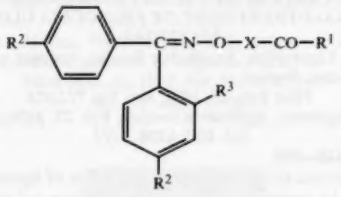
4,176,194

OXYALKANOIC ACID DERIVATIVES

Wilson S. Waring, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Mar. 17, 1978, Ser. No. 887,858
Claims priority, application United Kingdom, Apr. 1, 1977, 13837/77
Int. Cl.[2] **A61K** *31/24;* **C07C** *131/00*
U.S. Cl. 424—309 **5 Claims**

1. A compound of the formula:



wherein R^1 is a hydroxy or C_{1-4}-alkoxy radical; R^2 is a halogen atom; R^3 is hydrogen or a halogen atom; and X is a methylene diradical; or, when R^1 is a hydroxy radical, a pharmaceutically acceptable base-addition salt thereof.

4,176,195

PESTICIDAL α-CYANOBENZYL ESTER ENANTIOMER PAIR

Donald W. Stoutamire, Modesto, Calif., assignor to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jul. 20, 1978, Ser. No. 926,366

Int. Cl.[2] **A01N** *9/06, 9/20;* **C07C** *121/50, 121/60*

U.S. Cl. 424—304 **4 Claims**

1. An enantiomer pair consisting of S-α-cyano-3-phenoxybenzyl S-α-isopropyl-p-chlorophenylacetate and R-α-cyano-3-phenoxybenzyl R-α-isopropyl-p-chlorophenylacetate, said pair substantially free of other stereoisomers of α-cyano-3-phenoxybenzyl α-isopropyl-p-chlorophenylacetate.

3. A pesticidal composition which comprises, (a) as active ingredient, a pesticidally effective amount of an enantiomer pair consisting of S-α-cyano-3-phenoxybenzyl S-α-isopropyl-p-chlorophenylacetate and R-α-cyano-3-phenoxybenzyl R-α-isopropylp-chlorophenylacetate and (b) at least one surface-active agent or pesticide carrier, said composition substantially free of other stereoisomers of α-cyano-3-phenoxybenzyl α-isopropyl-p-chlorophenylacetate.

4,176,196

HYPOGLYCEMIC ARYLCYCLOHEXANE ACETIC ACIDS

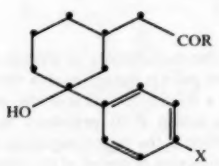
Lawrence S. Melvin, Jr., Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Nov. 4, 1977, Ser. No. 848,537

Int. Cl.[2] **A01K** *31/19, 31/215;* **C07C** *69/76*

U.S. Cl. 424—308 **5 Claims**

1. A method for lowering blood sugar in the treatment of a diabetic subject, which comprises administering to said subject an effective blood sugar lowering amount of a compound of the formula



I

wherein R is selected from —OR_1 and —NH_2;

X is selected from hydrogen and —OR_1;

R_1 is selected from hydrogen and alkyl of 1 to 4 carbon atoms;

and the pharmaceutically-acceptable salts of those compounds wherein R is —OH.

4,176,197

METHOD FOR TREATING ACNE VULGARIS

B. Newell Olson, Norwich, N.Y., assignor to Dominion Pharmacal, Inc., Norwich, N.Y.

Filed Feb. 3, 1978, Ser. No. 874,843

Int. Cl.[2] **A61K** *31/14, 31/195*

U.S. Cl. 424—319 **3 Claims**

1. A method of treating patients afflicted with acne which comprises topically applying to the skin of said patients a liquid solution consisting essentially of allantoin N-acetyl DL methionine complex in the order of 0.25 percent and quaternary ammonium chloride in the order of 0.13 percent and sufficient alkali to produce a final pH in the range of from pH 3 to 7.

4,176,198

METHOD OF TREATMENT

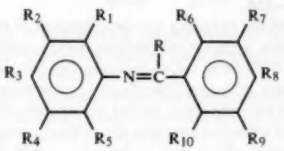
George W. Nuss, Jr., Lansdale; Norman J. Santora, Roslyn, and George H. Douglas, Malvern, all of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Filed Oct. 6, 1977, Ser. No. 839,960

Int. Cl.[2] **A61V** *31/275*

U.S. Cl. 424—330 **27 Claims**

1. A method of treating inflammation in warm-blooded animals comprising the topical administration to said animal of an effective amount of a pharmaceutically-active compound of the formula:



where:

R is hydrogen or alkyl;

R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9, R_{10} may be the same or different and are:

hydrogen,
alkyl,
cyano,
nitro,
amino,
halololoweralkoxy,
halololoweralkyl,
halo,
loweralkoxy and
hydroxy.

4,176,199

EXTRACTION OF PROTEIN FROM EDIBLE BEEF BONES AND PRODUCT

Arthur N. Vollmer, and George E. Rainey, both of Canton, Ohio, assignors to Sugardale Foods, Incorporated, Canton, Ohio

Filed May 15, 1978, Ser. No. 906,029

Int. Cl.[2] **A23J** *1/10;* **A23L** *1/313*

U.S. Cl. 426—59 **8 Claims**

1. The method of making edible gelatin bone, tallow and aqueous protein broth products from edible beef bones which consists in crushing edible beef bones to form bone fragments having a maximum dimension of up to ⅜"; forming an aqueous mixture of approximately equal amounts by weight of said bone fragments and water; adding to the aqueous mixture papain based proteolytic enzymes of the class consisting of Tona-300 and Papain 90L enzymes in the amount by weight of the bone fragments of about 3½% Tona-300 enzymes or 1/10th of 1% Papain 90L enzymes; heating and agitating the aqueous bone-enzyme mixture during a heating cycle at about at least 125° F. but not exceeding about 155° F. for approximately 3–3½ hours, and then at step-up temperatures of up to, but not exceeding, 195° F. for a total heating cycle time not exceeding 6

hours; maintaining a final 195° F. heating temperature for a time duration at the end of said heating cycle sufficient to inactivate the enzymes; said heating cycle treatment simultaneously separating the tallow from the bone fragments, and hydrolyzing and solubilizing protein in the bone fragments; filtering and screening the solids from the liquid in the heated mixture while maintaining the mixture at a temperature of between 135° F. and 190° F. to produce separated edible gelatin bone products having a maximum dimension not greater than ½", and a minimum dimension not less than 3/16" and a separated liquid; centrifuging the separated liquid while maintaining the temperature thereof between 135° F. and 190° F., to obtain edible tallow products, and an edible aqueous 4% to 7% by weight protein broth.

4,176,200

METHOD FOR REDUCING THE SURFACE DISCOLORATION OF FOOD SPREADS AND FOOD SPREADS PRODUCED THEREBY

Henricus M. Princen, Englewood, N.J., and Michael P. Aronson, Valley Cottage, N.Y., assignors to Lever Brothers Company, New York, N.Y.

Filed Sep. 19, 1977, Ser. No. 834,604
Int. Cl.[2] A23L *1/275;* A23D *5/04*
U.S. Cl. 426—250 **8 Claims**

1. A method for reducing the discoloration of the surface of a margarine-like, water-in-oil emulsion food spread comprising at least about 40% fat or oil, or mixtures thereof, occasioned by the evaporation of water therefrom, comprising the step of incorporating into the food spread an amount of good grade white pigment effective to cause the optical properties of said food spread when deydrated, to be comparable to the optical properties of a freshly made food spread.

4,176,201

SWEETENING COMPOSITION

Marvin K. Cook, Port Charlotte, Fla., assignor to MacAndrews and Forbes Company, Camden, N.J.

Filed Nov. 25, 1977, Ser. No. 854,604
Int. Cl.[2] A23L *1/236*
U.S. Cl. 426—548 **3 Claims**

1. A sweetening composition consisting essentially of about 85% to about 95% sorbitol, about 2.5% to about 7.5% potassium bitartrate, about 2.5% to about 7.5% ammoniated glycyrrhizin and about 0.025% to about 0.075% of a 5'-nucleotide, said percentages being by weight, based on the weight of the composition.

4,176,202

VEGETABLE PROTEIN INGREDIENT FOR KAMABOKO PRODUCTS

Carl D. Decker, St. Louis, Mo., and S. Kent Holt, Tokyo, Japan, assignors to Ralston Purina Company, St. Louis, Mo.

Continuation of Ser. No. 826,510, Aug. 22, 1977, abandoned. This application Oct. 4, 1978, Ser. No. 948,596
Int. Cl.[2] A23L *1/325*
U.S. Cl. 426—574 **13 Claims**

1. A kamaboko-type gelled fish product comprising comminuted fish flesh obtained from fresh fish or frozen surimi and a composition consisting essentially of between about 60 and 90% by weight of a vegetable protein isolate and about 10–40% by weight of a fat emulsion having a fat content exceeding 20% by weight, wherein the level of said composition does not exceed about 90% by weight of the fish flesh.

4,176,203

PROCESS AND AN APPARATUS FOR ALKALI-TREATMENT OF LIGNOCELLULOSIC MATERIAL

Gösta B. Lagerström, Ängelholm, Sweden, assignor to Boliden Aktiebolag, Sweden

Filed Feb. 25, 1977, Ser. No. 772,073
Claims priority, application Sweden, Feb. 27, 1976, 7602799
Int. Cl.[2] A23K *1/12*
U.S. Cl. 426—636 **6 Claims**

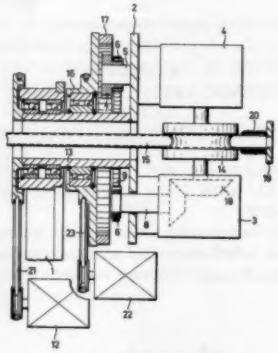
1. A process for increasing the feed value of lignocellulosic materials by treatment with a solution of a base and subsequent neutralization with an acid, comprising applying the alkaline solution on top of a mass of lignocellulosic material within a limited zone, and travelling said zone across the whole upper surface of said mass, said alkaline solution being applied at a rate essentially corresponding to the rate of uptake of said alkaline solution by the straw, draining and recirculating residual alkaline solution and subsequently neutralizing the alkali treated straw with an acid.

4,176,204

PROCESS FOR SHIRRING TUBULAR FILMS AND PRODUCT THEREOF

Bruno Winkler, Am Hummelberg 9, D-694 Weinheim-Oberflockenbach, Fed. Rep. of Germany

Division of Ser. No. 543,073, Jan. 22, 1975, Pat. No. 4,085,483. This application Sep. 23, 1977, Ser. No. 836,047
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1975, 2403740
Int. Cl.[2] A22C *13/02*
U.S. Cl. 426—140 **5 Claims**



1. A process for the manufacture of shirred tubular films, wherein an unshirred tube is passed over a shirring mandrel and pressed against a fixed stop and is at the same time subjected to a shirring action at its periphery by symmetrical shirring members which in the region engaging the tube move substantially in the direction of travel of the tube, wherein the shirring members which engage on the periphery of the tubes are caused to continuously rotate about the axis of the shirring mandrel in a selected direction.

2. A process according to claim 1 wherein the shirring action is produced by rotation of shirring rollers, each rotating on an axis perpendicular to said mandrel axis and each having a plurality of substantially identical teeth.

4,176,205

FINGERPRINT POWDER AND METHOD OF APPLICATION

Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 24, 1976, Ser. No. 669,926
Int. Cl.[2] A61B 5/10
U.S. Cl. 427—1 19 Claims

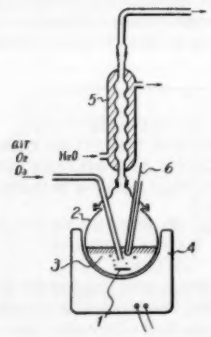
1. A method for detecting or developing a latent fingerprint on a surface, which comprises applying to said surface a composition comprising a carrier powder selected from the group consisting of talc and silica, and mixtures thereof, and a coloring agent capable of forming a colored pattern of the fingerprint in conjunction with said carrier powder, said coloring agent being a fluorescent dye, and viewing said surface containing the developed fingerprint under lighting conditions to obtain a colored fluorescent fingerprint pattern.

4,176,206

METHOD FOR MANUFACTURING AN OXIDE OF SEMICONDUCTOR

Makoto Inoue, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 2, 1976, Ser. No. 747,256
Claims priority, application Japan, Dec. 13, 1975, 50-150011
Int. Cl.[2] B05D 5/12
U.S. Cl. 427—82 9 Claims



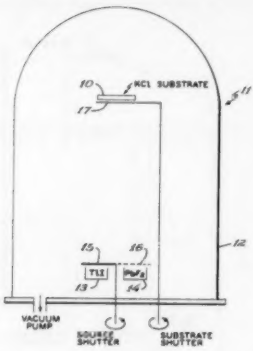
1. The method of manufacturing an oxide layer of semiconductor composition, comprising the steps of immersing a semiconductor compound substrate in heated water, and blowing an oxidizing gas in said water to dissolve at least as much as the maximum solubility of oxidizing gas at the temperature of said water between room temperature to boiling temperature.

4,176,207

NON-BIREFRINGENT THALLIUM IODIDE THIN FILMS FOR SURFACE PROTECTION OF HALIDE OPTICAL ELEMENTS

Thomas J. Moravec, Eden Prairie, and Richard A. Skogman, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 19, 1978, Ser. No. 952,764
Int. Cl.[2] G02B 1/10; B05D 1/36
U.S. Cl. 427—160 4 Claims



1. A method of preparing a non-birefringent cubic thallium iodide thin film protective coating on potassium chloride optical elements, the method comprising:

(a) provide an evaporative vacuum deposition system having therein a thallium iodide evaporation source and an optical buffer material evaporation source;

(b) provide a shutter for the evaporant sources;

(c) place a potassium chloride optical element to be coated in said evaporative deposition system;

(d) evacuate the vacuum deposition system to 5×10^{-6} torr pressure or lower;

(e) heat the evaporant sources to obtain deposition rates of not more than about 2000 A per minute from each;

(f) position the shutter to deposit first on said element a layer of cubic thallium iodide to a thickness of up to approximately 500 A;

(g) deposit next optical buffer material to a thickness of from about 5 A to about 50 A;

(h) repeat steps f and g a plurality of times to produce a coating of required thickness comprising alternating layers of cubic thallium iodide and optical buffer material;

(i) repeat step f to complete the coating.

4,176,208

PRODUCTION OF INHOMOGENEOUS FILMS BY SEQUENTIAL LAYERS OF HOMOGENEOUS FILMS

Thomas J. Moravec, Eden Prairie, and Richard A. Skogman, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 24, 1978, Ser. No. 963,550
Int. Cl.[2] G02B 1/10; B05D 1/36
U.S. Cl. 427—160 9 Claims

1. Preparation of a graded refractive index in an optical film antireflective coating on an optical element comprising the steps of:

(a) provide an evaporative vacuum deposition system having first and second evaporation sources of different optical coating materials of differing indices of refraction such that the values of the two indices satisfy the relationship for antireflecting characteristics at the desired wavelength;

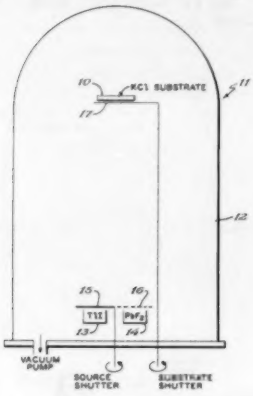
(b) provide a shutter for the evaporant sources;

(c) place an optical element to be coated in said evaporative deposition system;

(d) evacuate the vacuum deposition system to 5×10^{-6} torr pressure or lower;

(e) heat the evaporant sources to obtain desired deposition rates;

(f) deposit a plurality of thin film layer pairs of the two materials, that is, the first material followed by the second material onto the optical element, the first of the



layer pairs having the second material thin compared to the first material, the last of the layer pairs having the first material thin with respect to the second material, and the other layer pairs shifting between the thin second material and the thin first material relation in a predetermined manner to thereby provide a desired graded refractive index film.

4,176,209

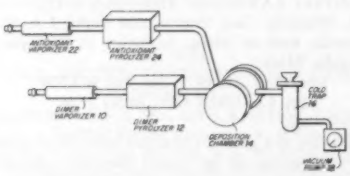
PROCESS FOR FORMING POLYMERIC PARAXYLYLENE COATINGS AND FILMS POSSESSING IMPROVED OXIDATION RESISTANCE

Thomas E. Baker, Northboro; George L. Fix, Grafton, and John S. Judge, Lexington, all of Mass., assignors to Raytheon Corporation, Lexington, Mass.

Filed Jan. 9, 1978, Ser. No. 868,159

Int. Cl.[2] C23C *11/00, 13/00*

U.S. Cl. 427—248 B **10 Claims**



1. In a chemical vapor deposition process for forming polymeric paraxylylene including the steps of producing vaporous polymeric paraxylylene precursor and subsequently condensing said precursor;

the improvement comprising condensing vaporized antioxidant simultaneously with said precursor, said antioxidant being a vaporizable and vapor-transportable material, to thereby incorporate said antioxidant into the polymeric paraxylylene formed.

4,176,210

PROCESS FOR MAKING URETHANE COATED DECORATIVE SHEET-TYPE COVERING MATERIAL

David B. Skinner, Allentown, Pa., assignor to GAF Corporation, New York, N.Y.

Filed Apr. 12, 1977, Ser. No. 786,885

Int. Cl.[2] B05D *5/00, 1/36*

U.S. Cl. 427—258 **5 Claims**

1. Process for making decorative sheet-type covering material comprising the steps of:

(a) forming sheet material comprising a layer of gelled foamable PVC plastisol or organosol on a substrate, said layer containing a blowing agent;

(b) applying a layer of nonfoamable PVC plastisol or organosol to said gelled foamable layer;

(c) gelling said layer of nonfoamable PVC plastisol or organosol;

(d) applying a layer of uncured polyurethane to the gelled layer of nonfoamable PVC plastisol or organosol; and

(e) then heating said sheet material to a temperature sufficient to decompose said blowing agent and cure all of said PVC and polyurethane layers.

4,176,211

C-SHAPED POLYESTER FILAMENTS

Henry G. Jackson, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 2, 1978, Ser. No. 902,199

Int. Cl.[2] B28B *21/54*

U.S. Cl. 428—397 **11 Claims**

1. A method for producing a polyester filament having a cross-section of C-shape, comprising extruding molten polyester through a spinneret having at least one array of circular holes in a pattern comprising a center hole with eight holes equally spaced around said center hole wherein each hole has an equal diameter of about 0.15 to about 0.75 mm and the radius at the center of each of the outside holes from the center of the central hole is up to about three times the diameter of the holes.

4,176,212

RADIATION AND MOISTURE CURABLE COMPOSITIONS AND METHOD OF USE

Karl Brack, Holliston, Mass., assignor to Design Cote Corporation, Natick, Mass.

Filed Jan. 25, 1978, Ser. No. 872,197

Int. Cl.[2] B05D *3/06*

U.S. Cl. 428—423 **25 Claims**

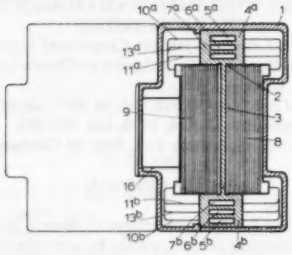
1. A radiation curable coating composition which comprises a compound containing both radiation curable and moisture curable reaction groups, said composition also containing both an isocyanate and an oxazolidine.

10. A method of coating or printing a substrate which comprises applying to said substrate a composition comprising a compound containing both radiation curable and moisture curable reaction groups, said composition also containing both an isocyanate and an oxazolidine and thereafter exposing said composition to radiation and to moisture.

4,176,213
BATTERY UNIT, CONTAINING ONE OR MORE FUEL-CELL BLOCKS

Jacques van Linden, Stein, Netherlands, assignor to Electrochemische Energieconversie, N.V., Mol, Belgium

Filed Jun. 29, 1978, Ser. No. 920,541
Claims priority, application Netherlands, Jun. 29, 1977, 7707180
Int. Cl.[2] H01M 8/04
U.S. Cl. 429—12 21 Claims

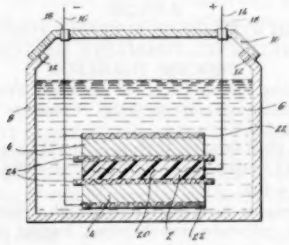


1. A battery unit comprising a plurality of fuel-cell blocks, each containing one or more fuel-cells, in which blocks duct means are provided for the supply and removal of fuel and oxidizing agent to and from said fuel-cells, wherein the said battery unit further comprises an elongate beam against which the fuel-cell blocks are placed, primary ducts in or on said beam for the transport of fuel and oxidizing agent, and secondary ducts connected to said primary ducts for the supply and removal of fuel and oxidizing agent, which secondary ducts are joined to the duct means in the fuel-cell blocks.

4,176,214
LITHIUM-LEAD SULFATE PRIMARY ELECTROCHEMICAL CELL

Keith A. Klinedinst, Marlborough, and Carl R. Schlaikjer, Winchester, both of Mass., assignors to GTE Laboratories Incorporated, Stamford, Conn.

Filed Dec. 26, 1978, Ser. No. 973,648
Int. Cl.[2] H01M 4/58
U.S. Cl. 429—194 12 Claims



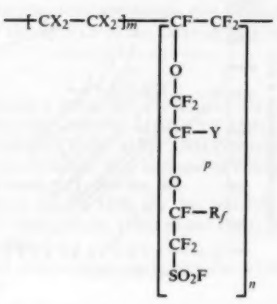
1. A primary electrochemical cell comprising:
(a) an anode comprising lithium metal;
(b) a cathode comprising lead sulfate; said anode and cathode being spaced from each other and in contact with
(c) an electrolytic solution which comprises a dissociable lithium salt dissolved in a liquid organic solvent.

4,176,215
ION-EXCHANGE STRUCTURES OF COPOLYMER BLENDS USEFUL IN ELECTROLYTIC CELLS

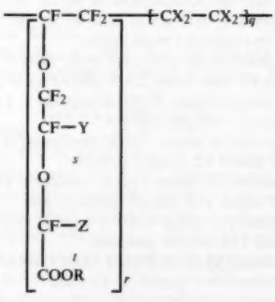
Charles J. Molnar, Wilmington, Del.; Edward H. Price, Kennett Square, Pa., and Paul R. Resnick, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 13, 1978, Ser. No. 886,338
Int. Cl.[2] C25B 1/00; B01D 3/04
U.S. Cl. 521—27 12 Claims

1. A film or membrane of a blend of 10 to 90% by wt. of a first fluorinated polymer which has repeating units



where
m is 3 to 15,
n is 1 to 10,
p is 0, 1 or 2,
the X's taken together are four fluorines or three fluorines and one chlorine,
Y is F or CF_3, and
R_f is F, Cl, or a C_1 to C_{10} perfluoroalkyl radical, and 90 to 10% by wt. of a second fluorinated polymer which has repeating units



where
q is 3 to 15,
r is 1 to 10,
s is 0, 1 or 2,
t is 2,
the X's taken together are four fluorines or three fluorines and one chlorine,
Y is F or CF_3,
Z is F or CF_3, and
R is lower alkyl.

4,176,216

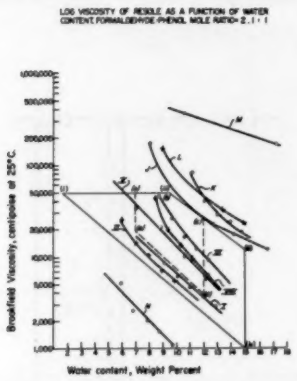
CELLULAR PRODUCTS DERIVED FROM PHENOL/FORMALDEHYDE RESOLES

Wallace G. Reid, Katonah, N.Y.; Rakesh Saini, Somerville, N.J., and Kenneth E. Atkins, South Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 820,020, Jul. 28, 1977. This application Sep. 29, 1978, Ser. No. 947,340

Int. Cl.[2] C08J *9/14;* **C08L** *61/08, 61/10*

U.S. Cl. 521—106 **21 Claims**


LOG VISCOSITY OF RESOLE AS A FUNCTION OF WATER CONTENT, FORMALDEHYDE-PHENOL MOLE RATIO= 2.1 : 1
Brookfield Viscosity, centipoise at 25°C.
Water content, Weight Percent

1. A phenolic foam having a density from about 1.90 to about 3.70 pounds per cubic foot and, within said density range, a friability of less than about 35 percent weight loss (after 10 minutes) and a compressive strength (parallel) of at least about 20 pounds per square inch, which foam is produced by foaming a reaction mixture containing a phenolic resole, an acidic catalyst, a blowing agent and a surface active agent,

wherein the said resole has been produced by the base-catalyzed condensation of formaldehyde and phenol at a formaldehyde-to-phenol mole ratio from about 1.6:1 to about 2.2:1, the aqueous alkaline condensate having been brought to a pH from about 5.0 to about 7.0 by the addition thereto of a salt-forming acidic compound, which resole is characterized by an average molecular weight such that a plot of log viscosity as a function of water content of the resole falls within the area defined by straight line interconnection in series of points (i)–(iv) where points (i)–(iv) are as follows for the indicated formaldehyde-to-phenol mole ratios:

(a) at a formaldehyde-to-phenol mole ratio of at least 1.9:1 and no more than about 2.2:1, points (i)–(iv) are:
  (i) a viscosity of about 50,000 centipoise at a water content of about 1.7 weight percent;
  (ii) a viscosity of about 50,000 centipoise at a water content of about 9.5 weight percent;
  (iii) a viscosity of about 12,000 centipoise at a water content of about 15.0 weight percent; and
  (iv) a viscosity of about 1,000 centipoise at a water content of about 15.0 weight percent;

(b) at a formaldehyde-to-phenol mole ratio of at least 1.7:1 and less than 1.9:1, points (i)–(iv) are:
  (i) a viscosity of about 50,000 centipoise at a water content of about 3.0 weight percent;
  (ii) a viscosity of about 50,000 centipoise at a water content of about 14.0 weight percent;
  (iii) a viscosity of about 25,000 centipoise at a water content of about 16.0 weight percent; and
  (iv) a viscosity of about 1,000 centipoise at a water content of about 16.0 weight percent;

(c) at a formaldehyde-to-phenol mole ratio of at least about 1.6:1 and less than 1.7:1, points (i)–(iv) are:
  (i) a viscosity of about 50,000 centipoise at a water content of about 6.5 weight percent;
  (ii) a viscosity of about 50,000 centipoise at a water content of about 12.5 weight percent;
  (iii) a viscosity of about 25,000 centipoise at a water content of about 16.0 weight percent; and
  (iv) a viscosity of about 3,000 centipoise at a water content of about 16.0 weight percent; wherein the said viscosity values are Brookfield at 25° C.

4,176,217

PROCESS FOR THE MANUFACTURE OF FOAMED PLASTICS WITH IMPROVED COMBUSTION CHARACTERISTICS

Leopold Golser, Leonding; Hubert Czepel, and Gernard Stern, both of Linz, all of Austria, assignors to Chemie Linz Aktiengesellschaft, Austria

Continuation of Ser. No. 819,503, Jul. 26, 1977, abandoned. This application Jan. 4, 1979, Ser. No. 895

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1976, 2634418

Int. Cl.[2] C08J *9/00*

U.S. Cl. 521—106 **7 Claims**

1. In a process for the production of foamed plastics with improved combustion characteristics by a condensation reaction of aminoplast precondensates with organic isocyanates with at least two isocyanate groups, in the presence of acid curing catalysts and an accelerator for polyurethane formation selected from the group consisting of tertiary amines and tin salts with metal-organic bonds, the improvement which consists essentially of: conductance passive

using as starting material an aqueous solution of a water-soluble aminoplast precondensate of formaldehyde and urea, the solution having a water content of 13 to 40% by weight;

adding this aqueous solution to the organic isocyanate which is already mixed with the accelerator for polyurethane formation, said accelerator being used in an amount of 0.5 to 5% by weight, relative to the foamable mixture;

adding to said organic isocyanate/accelerator mixture, at the same time as the aqueous solution of the aminoplast precondensate is added to the isocyanate/accelerator mixture, but separately from said solution of the aminoplast precondensate, the acid curing catalyst, said catalyst being used in an amount of 0.5–5% by weight, relative to the foamable mixture;

the proportion of isocyanate in the reaction mixture being 12 to 330% by weight, relative to the arithmetical solids content of the aqueous solution of the aminoplast precondensate;

whereby the ratio of water to organic isocyanate prior to the start of the reaction is 0.14 to 1.5 parts per weight water to 1 part per weight of organic isocyanate.

4,176,218

HIGH RESILIENCE FLEXIBLE FOAMED POLYURETHANES, FOAMABLE MIXTURES AND PROCESS THEREFOR

John G. Demou, Lincoln Park, and Edward R. Pray, Dearborn, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

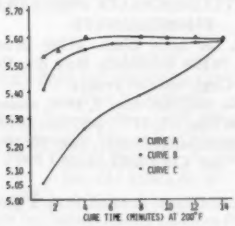
Filed Oct. 17, 1977, Ser. No. 842,621

Int. Cl.[2] C08G *18/24, 18/22, 18/63;* **C09K** *3/00*

U.S. Cl. 521—129 **15 Claims**

1. A process for the manufacture of high resilience, flexible, closed-mold, cold-cure, non-shrinking, foamed polyurethanes comprising reacting in the presence of a co-catalyst therefor a foamable mixture consisting of a co-catalyst, an organic polyisocyanate, water, and a polyol selected from the group consisting of (a) a polymer dispersion containing a hydroxyl-terminated, polyether-graft copolymer prepared by the in-situ polymerization of an ethylenically unsaturated monomer in a polyol and mixtures of (a) with (b) a polyoxyalkylene polyether polyol, wherein the proportion of said co-catalyst is

about 0.05 percent to about 5.0 percent by weight of at least one tertiary amine and about 0.01 percent to about 1 percent by weight of at least one metal-containing basic catalyst, said proportion being based upon the weight of said polyol and wherein said basic catalyst is selected from the group consisting of at least one of an alkali metal hydroxide, an alkaline earth metal hydroxide, and a basic metal salt thereof derived



from the reaction of said hydroxides with a weak inorganic acid or an organic acid.

12. The composition of claim 1 wherein said metal-containing basic catalyst is derived from the reaction of at least one alkali metal hydroxide or an alkaline earth metal hydroxide and an organic acid wherein said basic catalyst is selected from the group consisting of alkali metal or alkaline earth metal carboxylates alkoxides and phenates.

4,176,219

PROCESS FOR THE PRODUCTION OF 1,2-POLYBUTADIENE WITH REGULATED MOLECULAR WEIGHT

Kenya Makino, Kuwana; Tsunezo Ishikawa, Suzuka, and Koei Komatsu, Tokyo, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed May 30, 1978, Ser. No. 910,429

Claims priority, application Japan, May 30, 1977, 52-62230

Int. Cl.[2] C08F *4/74*

U.S. Cl. 526—92 **26 Claims**

1. A process for producing 1,2-polybutadiene with a regulated molecular weight which comprises contacting 1,3-butadiene with a catalyst composed of (A) a cobalt compound selected from the group consisting of cobalt chloride, cobalt bromide, cobalt iodide, cobalt naphthenate, cobalt octanoate, cobalt trisacetylacetonate, cobalt bisacetylacetonate and cobalt carbonyl, (B) an organic phosphine compound selected from the group consisting of triethylphosphine, triisopropylphosphine, a tri-n-butylphosphine, triphenylphosphine, tri-m-phenylphosphine, tri-m-xylylphosphine, and tri-m-tolylphosphine, (C) a trialkylaluminum and (D) water in an amount of 0.55 to 1.5 moles per mole of said trialkylaluminum in the presence of (E) at least one compound selected from the group consisting of allyl halides, alkyl-substituted allyl halides, benzyl halides, alkyl-substituted benzyl halides, and tertiary aliphatic halides, in an amount of 0.01 to 10 moles of component (E) per mole of component (C).

4,176,220

CATALYST COMPOSITION FOR RING-OPENING POLYMERIZATION OF NORBORNENE DERIVATIVES AND PROCESS FOR POLYMERIZING SAME

Hiroharu Ikeda; Shuichi Matsumoto, and Kenya Makino, all of Yokohama, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Division of Ser. No. 512,790, Oct. 7, 1974, Pat. No. 4,068,063. This application Sep. 27, 1977, Ser. No. 836,990

Claims priority, application Japan, Oct. 9, 1973, 48/113585; Oct. 9, 1973, 48/113586; Oct. 9, 1973, 48/113587

Int. Cl.[2] C08F *4/66, 4/70, 4/78*

U.S. Cl. 526—97 **32 Claims**

1. A process for producing a polymer or copolymer of a norbornene derivative, which comprises contacting at least one norbornene derivative having at least one ester group, or a monomer mixture of at least one of said norbornene derivatives and at least one cycloolefin other than cyclohexene, with a catalyst composition consisting essentially of a reaction mixture of (A) at least one member selected from the group consisting of compounds of W, Mo, Re and Ta, (B) at least one member selected from the group consisting of organometallic compounds of elements of Groups IA, IIA, IIB and IIIA of the Deming Periodic Table, and (C) at least one member selected from the group consisting of oxides, hydroxides, nitrates, sulfates, phosphates, acetylacetone complexes, and ammine complexes of V, Cr and Mn; oxides, sulfates, phosphates, acetylacetone complexes, cyclopentadienyl complexes, hydride complexes and silicides of elements of Group IVB of the Deming Periodic Table; and oxides, peroxides, hydroxides, sulfates, phosphates, acetylacetone complexes, and ammine complexes of elements of Group VIII of the Deming Periodic Table.

4,176,221

SOLUBLE RESINOUS PRODUCTS OF POLYEPOXIDE-AMINE ADDUCTS AND CYCLIC DICARBOXYLIC ACID ANHYDRIDES

David A. Shimp, Prospect, Ky., assignor to Celanese Polymer Specialties Company, Louisville, Ky.

Filed Jul. 14, 1978, Ser. No. 924,778

Int. Cl.[2] C08G *59/14;* C08L *63/00;* C08G *59/06*

U.S. Cl. 528—103 **14 Claims**

1. A resinous composition comprising the acid-amide reaction product of

(A) an adduct of

(1) a polyepoxide resin derived from a dihydric phenol and an epihalohydrin, said polyepoxide resin having a 1,2-epoxide equivalent weight of about 450 to about 4000; and

(2) an alkyl primary monoamine or a polyamine having at least 2 amine nitrogen atoms per molecule and at least 3 amine hydrogen atoms per molecule, said amines having no other groups reactive with epoxide groups; and

(B) maleic or succinic anhydride wherein about one mol of (2) is reacted with each epoxide equivalent of (1) and wherein about 0.5 to 1 mol of (B) is reacted per each amine nitrogen atom in said adduct.

4,176,222

PRODUCTION OF AROMATIC POLYETHERS

Michael B. Cinderey, Stevenage, and John B. Rose, Letchworth, both of England, assignors to Imperial Chemical Industries Limited, Great Britain

Filed Jan. 30, 1978, Ser. No. 873,478

Claims priority, application United Kingdom, Feb. 1, 1977, 4009/77

Int. Cl.[2] C08G *65/40*

U.S. Cl. 528—126 **13 Claims**

1. A process for the production of an aromatic polyether containing —SO_2— and/or —CO— linkages comprising heating in the temperature range 100° to 400° C. (i) a substantially equimolar mixture of (a) at least one bisphenol and (b) at least one dihalobenzenoid compound, or (ii) at least on halophenols, in which dihalobenzenoid compound or halophenol the halogen atoms are activated by —SO_2— or —CO— groups ortho or para thereto, with a mixture of sodium carbonate or bicarbonate and a second alkali metal carbonate or bicarbonate, the alkali metal of said second alkali metal carbonate or bicarbonate having a higher aromatic number than that of sodium, the amount of the second alkali metal carbonate or bicarbonate being such that there are 0.001 to 0.2 gram atoms of said alkali metal of higher atomic number per gram atom of sodium, the total amount of alkali metal carbonate or bicarbonate being such that there is at least one alkali metal atom for each phenol group present, and thereafter separating the polymer from alkali metal halide.

4,176,223

POLYIMIDE-ESTERS AND FILAMENTS PREPARED FROM 4-(4'-CARBOXYPHTHALIMIDO)BENZOIC ACID OR 4-(4'-HYDROXYPHTHALIMIDO)PHENOL

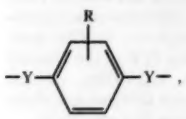
Robert S. Irwin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 18, 1978, Ser. No. 970,234

Int. Cl.[2] C08G *73/16*

U.S. Cl. 528—170 **5 Claims**

1. A filament-forming polyimide-ester consisting essentially of units having the structural formulas



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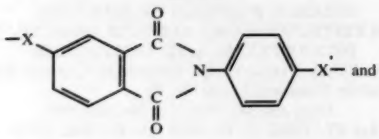
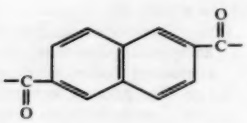


II



III

such that when X is

Y is —O—; R is Cl or 1 to 2 carbon alkyl; unit III is present in an amount of from 5–20 mole percent based on the total number of moles of units; and the sum of moles of units II and III is substantially equal to the number of moles of unit I; and when X is —O—; Y is

R is H; unit III is present in an amount of from 5–20 mole percent based on the total number of moles of units; and the sum of moles of units I and III is substantially equal to the number of moles of unit II.

4,176,224

POLY (ETHYLENE/ALKYLENE) TEREPHTHALATES WHICH CRYSTALLIZE RAPIDLY

Peter Bier; Rudolf Binsack, and Hugo Vernaleken, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 23, 1978, Ser. No. 889,584

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1977, 2715932

Int. Cl.[2] C08G *63/18*

U.S. Cl. 528—309 **13 Claims**

1. A highly crystalline, thermoplastic terephthalic acid copolyester which crystallizes rapidly and consists of at least about 90 mol %, relative to the dicarboxylic acid component, of terephthalic acid radicals, about 98 to 99.9 mol %, relative to the diol component, of ethylene glycol radicals and about 0.1 to 2.0 mol %, relative to the diol component, of 2-ethylhexane-1,3-diol radicals.

4,176,225

NYLON POLYCONDENSATE FROM DIAMINO PHOSPHONATE

Georges Sturtz, 22, rue Léon Blum, 29200 Brest, and Jean-Claude Clement, 76106 Résidence Bois des Roches, 91240 Saint Michel sur Orge, both of France

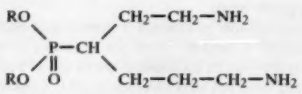
Division of Ser. No. 693,686, Jun. 7, 1976, abandoned. This application May 31, 1977, Ser. No. 801,809

Claims priority, application France, Jun. 10, 1975, 75 18179

Int. Cl.[2] C08G *69/26*

U.S. Cl. 528—337 **10 Claims**

1. A nylon polycondensate formed from a phosphonate of the formula:



wherein R is C_{1-5} alkyl and a dicarboxylic acid of the formula HOOC—R″—COOH wherein R″ is a divalent aromatic or aliphatic hydrocarbon radical.

4,176,226

BISPIPERAZIDO PHOSPHORUS POLYAMIDES

Johny C. Hermans, Wespelaar, Belgium, assignor to s.a. Texaco Belgium n.v., Brussels, Belgium

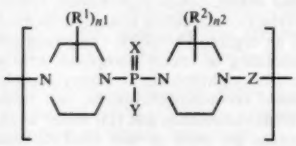
Division of Ser. No. 628,262, Nov. 3, 1975, Pat. No. 4,098,768. This application Jun. 23, 1978, Ser. No. 918,248

Claims priority, application United Kingdom, May 21, 1975, 21974/75

Int. Cl.[2] C08G *79/02*

U.S. Cl. 528—332 **12 Claims**

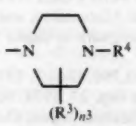
1. A solid polymer consisting essentially of repeating units of the formula:



wherein

(i) X is absent or represents oxygen or sulphur or =N—R;

(ii) Y represents an aliphatic, cycloaliphatic, or aromatic hydrocarbon group or an N-containing heterocyclic group; or —OR or —NR_2; or —NR_2 in which the two R groups, together with the nitrogen atom to which they are attached, represent an N-containing heterocyclic ring; or a group of the formula:



wherein R, R^1, R^2, and R^3 represent hydrogen, or an aliphatic, cycloaliphatic, or aromatic hydrocarbon group or an N-containing heterocyclic group;

(iii) R^4 represents hydrogen or an aliphatic group, a cycloaliphatic group, an N-containing heterocyclic group, an acyl group, a sulfonyl group, or an unsubstituted carbamoyl group;
(iv) n^1, n^2, and n^3 each represent zero or an integer;
(v) Z represents —OC—R^5—SO_2—; and
(vi) R^5 represents an aliphatic, cycloaliphatic, or aromatic hydrocarbon radical, or an N-containing heterocyclic radical.

4,176,227
PROCESS FOR INCORPORATING CaF_2 INTO POLYAMIDES
William M. Baggett, and LeMoyne W. Plischke, both of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.
Filed Oct. 2, 1978, Ser. No. 947,799
Int. Cl.[2] C08G *69/49*
U.S. Cl. 528—488 **11 Claims**

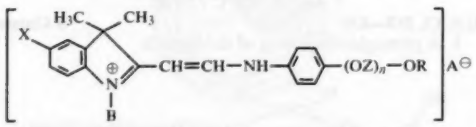
1. A process for incorporating calcium fluoride into a nylon comprising reacting a calcium salt with a fluoride salt in a molten nylon.

4,176,228
POTASSIUM-MAGNESIUM-CALCIUM GLYCYRRHIZIN
Harold A. Hartung, West Collingswood, N.J., assignor to MacAndrews and Forbes Company, Camden, N.J.
Filed Sep. 14, 1978, Ser. No. 942,313
Int. Cl.[2] C07H *15/20*
U.S. Cl. 536—4 **9 Claims**

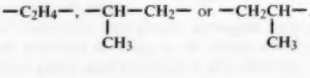
7. Potassium-magnesium-calcium glycyrrhizin of the formula $K_xMg_yCa_2G$ wherein G is glycyrrhizic acid and the sum of x, 2y and 2z is 2.

4,176,229
BASIC DYES
Hellmut Kast, Bobenheim-Roxheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany
Filed Aug. 2, 1978, Ser. No. 930,200
Int. Cl.[2] C07D *209/04*
U.S. Cl. 542—422 **2 Claims**

1. A basic dye of the general formula

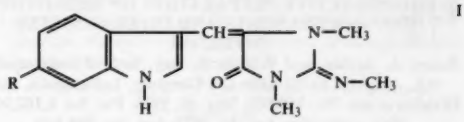


where $A^{\ominus}$ is an anion, B is methyl, ethyl, benzyl or β-hydroxyethyl, n is 1 or 2, R is alkyl of 1 to 4 carbon atoms, X is hydrogen, methoxy, ethoxy or chlorine and Z is



4,176,230
5-(6-ALKYLINDOL-3-YLMETHYLENE)-1,3-DIMETHYL-2-(METHYLIMINO)-4-IMIDAZOLIDINONES
Andrew D. Batcho, North Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.
Filed Aug. 4, 1977, Ser. No. 821,854
Int. Cl.[2] C07D *403/06*
U.S. Cl. 542—444 **3 Claims**

1. A compound of the formula

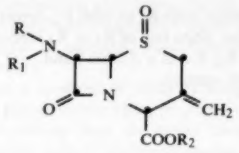


I

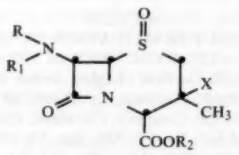
wherein R is lower alkyl, its geometric isomers, or a pharmaceutically acceptable acid addition salt thereof.

4,176,231
PROCESS FOR PREPARING 3-EXOMETHYLENECEPHAM SULFOXIDES
John R. Corfield, Runcorn, and Clifford G. Taylor, Warrington, both of England, assignors to Lilly Industries Limited, London, United Kingdom
Filed Jun. 1, 1978, Ser. No. 911,621
Claims priority, application United Kingdom, Dec. 24, 1977, 53897/77
Int. Cl.[2] C07D *501/04*
U.S. Cl. 544—16 **4 Claims**

1. A process for the preparation of a 3-exomethylenecepham sulfoxide of the formula



by reacting a 3-halo-3-methylcepham sulfoxide of the formula



with mercuric or mercurous perchlorate in an inert organic solvent wherein the above formula R and R_1 are independently hydrogen or an acyl group derived from a carboxylic acid, R_2 is a carboxylic acid protecting group and X is bromine or iodine.

4,176,232
SULFONIC ACID SALTS OF ACYLOXYALKYLAMINES
Sheldon N. Lewis, Willow Grove, and Jerome F. Levy, Dresher, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.
Filed Jun. 27, 1968, Ser. No. 740,480
Int. Cl.[2] C07C *69/54*
U.S. Cl. 560—222 **8 Claims**

1. An alkyl, cycloalkyl, alkaryl, aralkyl, or halogen-substituted alkyl, cycloalkyl, alkaryl, or aralkyl sulfonic acid salt of 2-aminoethyl methacrylate or 2-aminoethyl acrylate.

4,176,233

STEREOSELECTIVE PREPARATION OF HEXAHYDRO DIBENZOPYRANONES AND INTERMEDIATES THEREFOR

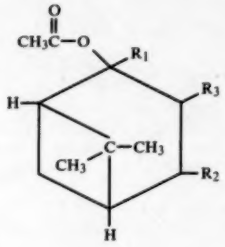
Robert A. Archer, and William A. Day, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 740,502, Nov. 10, 1976, Pat. No. 4,102,902. This application Apr. 21, 1978, Ser. No. 898,610

Int. Cl.[2] C07C *69/16*

U.S. Cl. 560—249 **3 Claims**

1. A compound of the formula



wherein:

R_1 is acetoxy or, taken together with R_3, forms a double bond;

R_2 is acetoxy or, taken together with R_3, forms a double bond; and

R_3, taken together with R_1 or with R_2, forms a double bond, provided that when one of R_1 or R_2 is acetoxy, the other, taken with R_3, forms a double bond, and that R_1 and R_2 both are not acetoxy.

4,176,234

PROCESS FOR THE OXIDATION OF OLEFINS TO ALDEHYDES AND ACIDS

Robert K. Grasselli, Garfield Heights; Arthur F. Miller, Cleveland, and Harley F. Hardman, Lyndhurst, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 676,039, Apr. 12, 1976, abandoned, which is a continuation of Ser. No. 112,782, Feb. 4, 1971, abandoned. This application May 26, 1977, Ser. No. 800,980

Int. Cl.[2] C07C *45/04, 51/32, 57/04*

U.S. Cl. 562—546 **13 Claims**

1. The process for the conversion of an olefin selected from the group consisting of propylene, isobutylene and mixtures thereof, to the corresponding unsaturated aldehydes and unsaturated carboxylic acids, comprising reacting in the vapor phase at a temperature of from about 500° to 900° F. and at a pressure of from about 0.5 to 5 atmospheres said olefin with a molecular oxygen-containing gas in the presence of a catalyst of the empirical formula:

$$A_aB_bC_cFe_dBi_eMo_fO_x$$

wherein A is an alkali metal, B is phosphorus or arsenic or both, and C is at least one element selected from Group IIA of the Periodic Classification of elements, and wherein (a) is 0, (b) is a number from 0 to 3, (c) is a number from 0.1 to 10, (d) and (e) are each a number from 0.1 to 6, (f) is a number from 8 to 16, and (x) is a number determined by the valence requirements of the other elements present.

4,176,235

SUBSTITUTED ACYL DERIVATIVES OF AMINO ACIDS

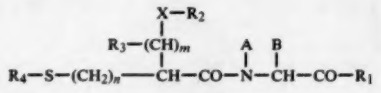
Miguel A. Ondetti, Princeton, and Frank L. Weisenborn, Titusville, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 889,768, Mar. 24, 1978, which is a division of Ser. No. 747,280, Dec. 3, 1976, Pat. No. 4,116,962. This application Dec. 4, 1978, Ser. No. 966,285

Int. Cl.[2] C07C *153/07, 149/20*

U.S. Cl. 562—556 **10 Claims**

1. A compound of the formula



and salts thereof,

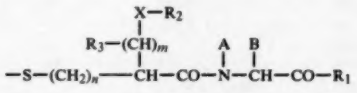
wherein

R_1 is hydroxy or lower alkoxy;

R_2 is hydrogen, lower alkyl or lower alkanoyl;

R_3 is hydrogen or lower alkyl;

R_4 is hydrogen, lower alkanoyl, benzoyl or



A is hydrogen, lower alkyl or hydroxy-lower alkylene;

B is hydrogen, lower alkyl, hydroxy-lower alkylene, amino-lower alkylene, guanidino-lower alkylene, mercapto-lower alkylene, lower alkylmercapto-lower alkylene, carbamoyl-lower alkylene or carboxy lower alkylene; X is oxygen or sulfur;

m is 0, 1 2, 3 or 4; and

n is 0 or 1.

4,176,236

COMPOSITION AND PROCESS

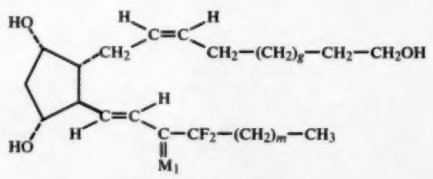
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,369, Jan. 28, 1976, Pat. No. 4,032,576. This application Apr. 6, 1977, Ser. No. 784,995

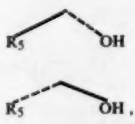
Int. Cl.[2] C07C *177/00*

U.S. Cl. 568—838 **8 Claims**

1. A prostaglandin analog of the formula



wherein M_1 is



wherein R_5 is hydrogen or methyl;

wherein g is one, 2, or 3; and

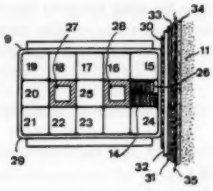
wherein m is one to 5, inclusive.

4,176,237

FOUR A INDUCTION

Roald Bingen, Marcinelle, Belgium, assignor to Ateliers de Constructions Electriques de Charleroi (ACEC), Charleroi, Belgium

Filed Jan. 31, 1978, Ser. No. 873,843
Claims priority, application Belgium, Feb. 1, 1978, 17916
Int. Cl.[2] H05B 5/16
U.S. Cl. 13—27 9 Claims



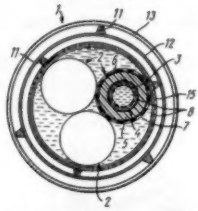
3. An induction furnace having at least one coil connected to a source of alternating current of a predetermined frequency wherein the coil is constituted by at least one loop of a composite conductor constituted by strands of elementary conductors twisted between themselves by parallel transposition and the said strands being twisted by parallel transposition around at least one conduit of cooling liquid constituted by a succession of spacers placed one after the other with spaces between successive spacers and by an outer sheating of the said composite conductor.

4,176,238

COOLED MULTIPHASE AC CABLE

Mikhail L. Vulis; Valery A. Golenchenko; Igor V. Rybin, and Pavel B. Shenderovich, all of Moscow, U.S.S.R., assignors to Gosudarstvenny Nauchno-Issledovatelsky Energeticheskiy Institut Imeni G.M. Krzhizhanovskogo (ENIN), Moscow, U.S.S.R.

Filed Jan. 19, 1978, Ser. No. 870,860
Int. Cl.[2] H01B 12/00
U.S. Cl. 174—15 S 5 Claims



1. A cooled multiphase ac cable comprising:

a helically wound internal layer of stabilized superconducting material per phase;

a layer of material, per phase, serving as an electrostatic shield of a respective phase, arranged helically on said internal layer of stabilized superconducting material and concentrically thereto;

a layer of dielectric, per phase, arranged helically on said layer of material serving as an electrostatic shield of a respective phase and concentric ally thereto;

a second layer of material, per phase, serving as an electrostatic shield of a respective phase, arranged helically on said layer of dielectric and concentrically thereto;

an external layer of stabilized superconducting material, per phase, arranged helically on said second layer of material serving as an electrostatic shield of a respective phase and concentrically thereto;

a plurality of closed conductors of superconducting material serving as a means for protecting said multiphase ac cable against the effect of the axial magnetic flux;

a group of said closed conductors of said plurality of conductors, embracing the surface of said internal layer of each said phase;

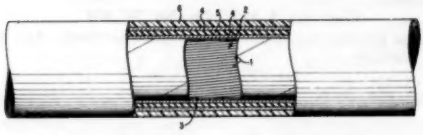
a group of said closed conductors of said plurality of conductors, embracing said external layers of said phases and being electrically associated.

4,176,239

INSULATED ELECTRICAL CABLE CONTAINING AN AGENT FOR DECONTAMINATING AND SEALING THE INTERIOR SPACE THEREOF

Melvin Brauer, East Brunswick, and Thaddeus F. Kroplinski, Bound Brook, both of N.J., assignors to N L Industries, Inc., New York, N.Y.

Continuation of Ser. No. 728,339, Sep. 30, 1976, abandoned, which is a division of Ser. No. 632,180, Nov. 17, 1975, Pat. No. 4,008,197, which is a continuation-in-part of Ser. No. 432,479, Jan. 11, 1974, abandoned. This application Mar. 9, 1978, Ser. No. 884,976
Int. Cl.[2] H01B 7/28, 3/30
U.S. Cl. 174—23 C 13 Claims



1. An insulated electrical device containing a plurality of insulated wire conductors, said device having interior spaces between the insulated wire conductors which contain a cured, cross-liked, mineral oil extended polyurethane which is non-spewing, comprising:

(a) from about 8 to about 45 parts by weight, of polyurethane, said polyurethane being prepared by reacting,

(i) a polyol selected from the group consisting of castor oil, polyether polyols, hydroxyl bearing homopolymers of butadiene, hydroxyl bearing copolymers of butadiene and styrene, and combinations thereof, with

(ii) a polyisocyanate prepolymer prepared by reacting a polyisocyanate with a polyol selected from the group consisting of castor oil, polyether polyols, hydroxyl bearing homopolymers of butadiene, hydroxyl bearing copolymers of butadiene and styrene, and combinations thereof,

(b) from about 25 to about 75 parts, by weight, of mineral oil, and

(c) from about 10 to about 35 parts, by weight, of coupling agent, said coupling agent being characterized by

(i) being miscible in all proportions with said mineral oil,

(ii) having a solubility parameter between 7.0 and 9.5,

(iii) having a hydrogen bonding index number in the range of from 6.0 to 12.0, and

(iv) being non-reactive with the polyurethane percursor, and

wherein the cured, cross-linked, mineral oil extended polyurethane is further characterized by the presence of a polybutadiene moiety in the polyurethane structure.

4,176,240

FILLED ELECTRICAL CABLE

Raffaele A. Sabia, Atlanta, Ga., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 30, 1978, Ser. No. 910,192
Int. Cl.[2] H01B 7/28
U.S. Cl. 174—23 C 3 Claims

1. A cable comprising:

a plurality of conductors contained within a sheath leaving voids between the conductors, and between the conductors and the sheath, and a filling material filling the voids

the invention characterized in that the filling material comprises a mixture of:

(X) ASTM Type 104A (napthenic) oil having a minimum sp. gr. of 0.860, a minimum SUS viscosity at 210 degrees F. of 45, a maximum pour point ASTM D 97 of 10 degrees F. and a maximum of 5 percent aromatic oils,

(Y) a styrene-ethylene butylene-styrene block copolymer having a styrene-rubber ratio of approximately 0.4 and

(Z) polyethylene having a softening point of 110 degrees C. to 130 degrees C.

the ingredients X, Y and Z having relative proportions falling within the shaded area bounded by ABCDEF of the FIGURE.

4,176,241

FLUID-TIGHT PROTECTIVE SYSTEM FOR AN ELECTROMECHANICAL COMPONENT

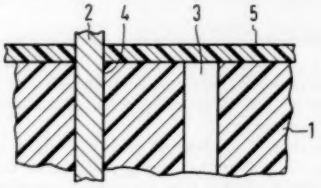
Helmut Schedele, Hoegling, and Romuald von Tomkewitsch, Ebenhausen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Apr. 1, 1977, Ser. No. 783,838

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1976, 2616299

Int. Cl.[2] H05K *5/06*

U.S. Cl. 174—52 S **14 Claims**



1. A fluid-tight protection system for an electromechanical component in a casing in which an insulating sealing absorbent covering layer is disposed as a seal over substantially all portions of the casing requiring sealing, said sealing covering layer comprising a fleece material means with high capillary absorption capacity which is impregnated with a sealing compound and which distributes the sealing compound evenly by said high capillary absorption capacity, said sealing compound having a thin liquid form when impregnating.

4,176,242

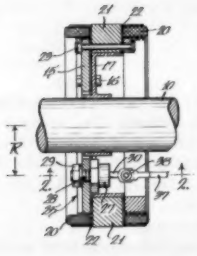
DIODE HOUSING

Phillip S. Linscott, Jr., Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jan. 16, 1978, Ser. No. 869,754

Int. Cl.[2] H05K *5/06*

U.S. Cl. 174—52 H **1 Claim**



1. A dynamo-electric machine comprising, in combination, a rotatable shaft with a maximum rotational speed and having a mounting member extending radially thereof, a diode having a body and a stem extending therefrom with a disc of glass-type insulating material positioned therebetween, a mounting member extending from said diode body in a direction opposite from said stem and connected to said mounting member to have said diode in axially parallel relation with said shaft, an electrical lead connected to the stem at a mounting hole in the stem by attaching means, and said disc having a thickness to prevent fracture by a bending moment imparted to the stem resulting from centrifugal force of the stem and connected structure, and said thickness having a minimum value of t min in inches, in the equation:

$$t_{min}=6.886\times10^{-8}\times W\times N^2\times R\times L/D^4$$

wherein

W = weight of the stem and parts supported thereby measured in grams;

N = maximum rotational speed of the rotatable shaft in revolutions per second;

R = radial distance from centerline of the rotatable shaft to the centerline of the stem in inches;

L = axial length of stem from an exposed face of the disc to the centerline of the mounting hole in inches; and

D = diameter of stem in inches.

4,176,243

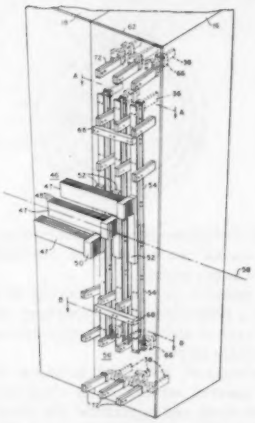
BUS CONNECTOR FOR WELDED ELECTRICAL SWITCHBOARD BUS STRUCTURE

George N. Kovatch, Monroeville; Richard Rosey, Plum Borough, both of Pa., and Ned H. Simon, Queeny Township, St. Louis County, Mo., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 756,035, Dec. 30, 1976, Pat. No. 4,099,220. This application Mar. 17, 1978, Ser. No. 887,896

Int. Cl.[2] H02B *1/04*

U.S. Cl. 174—72 B **7 Claims**



1. In an electrical power distribution switchboard bus system having a plurality of parallel-connected main horizontal bus bars electrically connected to a vertical riser bus, an improved bus connector block comprising:

a pair of end surfaces;

a bottom surface welded to the vertical riser bus; and a pair of side surfaces non-parallel to said bottom surface,

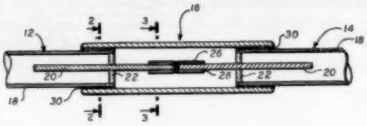
at least one of said side surfaces comprising locating means positioning and receiving the ends of the main horizontal bus bars which are welded to said bus connector block.

4,176,244

METALLURGICAL BONDED CONNECTOR FOR COAXIAL CABLES

Towheed Ramy, Jersey City, and Lal M. Hore, Fanwood, both of N.J., assignors to General Cable Corporation, Greenwich, Conn.

Filed Sep. 8, 1977, Ser. No. 831,415
Int. Cl.[2] H02G *15/08*
U.S. Cl. 174—88 C **10 Claims**



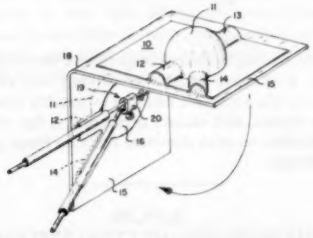
1. A coaxial cable connection for joining the ends of lengths of coaxial cable that have a center inner conductor, an outer aluminum conductor, and means for holding the inner and outer conductors in coaxial relation with one another including in combination an end of one outer conductor which is spaced longitudinally back from an end of an inner conductor of said cable, an outer conductor sleeve with opposite end portions that are constructed to extend around the outside and confront the circumference of the outer conductor of one of said lengths of cable, and similarly around the outside of the outer conductor of said other length of cable that is spaced from the first length of cable, the connector sleeve having the final shape to join the cable ends before being brought to the cables, at least one of the confronting faces of the sleeve and outer conductor at each end of the sleeve being coated with a metallurgical bonding agent which is subjected to heat when in the final assembled position, said bonding agent having a fusion temperature that does no damage to the insulation within the cable, so that the connector sleeve is metallurgically bonded to the outer face of both of the outer conductors, and the length of the outer conductor sleeve extends beyond the ends of the outer conductors that are spaced back axially from the inner conductors of the coaxial cable.

4,176,245

WIRE SPLICE INSULATORS

William A. Merlack, and John H. Royston, both of Pittsburgh, Pa., assignors to Royston Laboratories, Inc., Pittsburgh, Pa.

Filed Apr. 18, 1978, Ser. No. 897,353
Int. Cl.[2] H02G *15/08*
U.S. Cl. 174—92 **6 Claims**



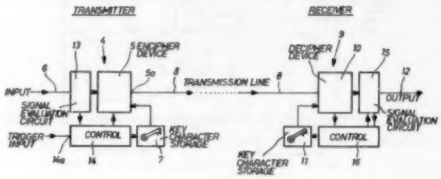
1. A wire splice insulator comprising a pair of substantially rigid flat base members in side by side relationship, a sheet of soft conformable self-sealing cohesive elastomer beneath and adhered to said base members, a dome extending outwardly from each said base member and elastomer sheet generally centrally of the base member and forming a cavity in the base member and elastomer sheet, a plurality of semi-tubular sheaths in each base member and elastomer sheet extending from the dome to adjacent the edge of the base members and forming semi-cylindrical cavities in said base members and sheets, said domes and tubular sheaths in the pair of base members being mirror images of each other, a soft non-hardening mastic adhesive insulating material filling the cavities in the elastomer and a parting sheet on the elastomer sheet and mastic opposite the base members, said insulator forming on folding the base members and elastomer sheet together a unitary insulated and sealed whole.

4,176,246

APPARATUS FOR THE TRANSMISSION END-ENCIPHERING AND RECEPTION END-DECIPHERING OF INFORMATION

Robert Gaetzi, Steinhausen, Switzerland, assignor to Anstalt Europaische Handelsgesellschaft, Liechtenstein

Filed Mar. 14, 1978, Ser. No. 886,532
Claims priority, application Switzerland, Mar. 16, 1977, 3307/77
Int. Cl.[2] H04L *9/00*
U.S. Cl. 178—22 **5 Claims**



1. An apparatus for the transmission end-enciphering and reception end-deciphering of information, comprising:

means defining a transmitter station;

said transmitter station comprising:

an enciphering device for receiving plain text in the form of information signal groups separated from one another by separation signals;

a key character-information storage connected with said enciphering device;

said key character-information storage delivering key character-information needed for enciphering to said enciphering device;

a controllable control circuit connected with said key character-information storage;

means defining a receiver station;

said receiver station comprising:

a deciphering device for deciphering the received information;

a key character-information storage connected with said deciphering device;

said key character-information storage delivering the key character-information needed for deciphering to said deciphering device;

a control circuit connected with said key character-information storage;

said key character-information storage at the transmitter station and said key character-information storage at said receiver station storing at least two different types of key character-information which can be selectively delivered to the related enciphering device and the deciphering device;

said control circuit at the transmitter station, when activated, causing a change of the key character-information delivered by the key character-information storage at the transmitter station to the enciphering device and replacing the separation signals between the information signal groups, by virtue of such change, with control signals representative of the key character-information;

said control circuit at the receiver station upon detection of the control signals indicative of the change of the key character-information causing a corresponding change of the key character-information delivered by the key cha-

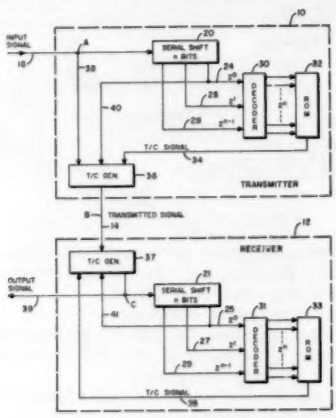
racter-information storage at the receiver station to the deciphering device, and replacing such control signals by the separation signals originally introduced at the transmitter station, so that there appears at the output side of the deciphering device at the transmitter station a signal sequence which again corresponds to the signal sequence entered to the enciphering device at the receiver station.

4,176,247

SIGNAL SCRAMBLER-UNSCRAMBLER FOR BINARY CODED TRANSMISSION SYSTEM

Robert M. Englund, Golden Valley, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 10, 1973, Ser. No. 405,219
Int. Cl.[2] H04L *9/00*
U.S. Cl. 178—22 **11 Claims**



1. In a transmission system of a binary digital signal, a signal scrambler comprising:

a shift register having a plurality of bit positions;

a memory having a plurality of addressable locations for storing the alternative True state or Complement state in each of said addressable locations, each of said stored True or Complement states generating a corresponding True or Complement output when selected by said shift register;

means responsively coupling said memory to said shift register for selecting one of said addressable locations;

a True/Complement generator;

a node A for receiving an uncoded input signal of alternative binary digits of 0 or 1;

a node B for emitting an encoded transmitted signal of alternative binary digits of 0 or 1;

means coupling said node A to a first bit position of said shift register;

means coupling said node A to said True/Complement generator;

means coupling the True or Complement output of said memory to said True/Complement generator;

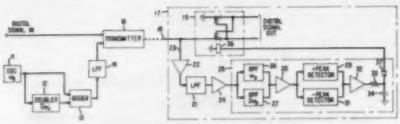
means coupling a second bit position of said shift register to said True/Complement generator for forcing said True/Complement generator to couple the True of said uncoded input signal to said node B until said second bit position receives its initial 1 bit from said node A and thereafter forcing said True/Complement generator to couple the True or the Complement of said uncoded input signal to said node B under control of the True or the Complement output of the memory addressable location that is selected by said shift register.

4,176,248

SYSTEM FOR IDENTIFYING AND CORRECTING THE POLARITY OF A DATA SIGNAL

Laurence L. Sheets, Atkinson, N.H., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 23, 1977, Ser. No. 863,870
Int. Cl.[2] H04L *1/00*
U.S. Cl. 178—67 **10 Claims**



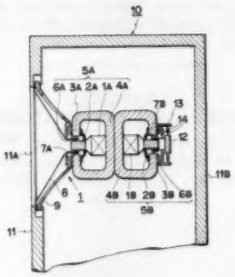
1. A method for identifying the polarity of a transmitted message signal comprising the steps of (1) generating an asymmetrical signal, (2) adding said asymmetrical signal to said message signal before transmission to mark the polarity of said message signal, and (3) detecting the polarity of said asymmetrical signal after transmission to identify the polarity of said transmitted message signal.

4,176,249

DELETERIOUS MECHANICAL VIBRATIONS FROM DYNAMIC LOUDSPEAKER OFFSET BY ADDITIONAL DYNAMIC DEVICE

Kiyofumi Inanaga; Saburo Egawa, both of Tokyo; Akio Shimizu, Niiza, and Keijiro Maeda, Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 24, 1978, Ser. No. 927,007
Claims priority, application Japan, Jul. 25, 1977, 52-88351
Int. Cl.[2] H04R *9/06*
U.S. Cl. 179—1 E **11 Claims**



1. A dynamic loudspeaker comprising a diaphragm having a voice coil, first drive means for driving said diaphragm to originate sounds, a massive member vibratably coupled to said first drive means, and second drive means for vibrating said massive member so as to eliminate reaction force generated by said diaphragm.

4,176,250

TIME DIVISION MULTIPLEXING SYSTEM FOR AN AUTOMOBILE

Bradford L. Berglind, Marietta, Ga., assignor to General Motors Corporation, Detroit, Mich.

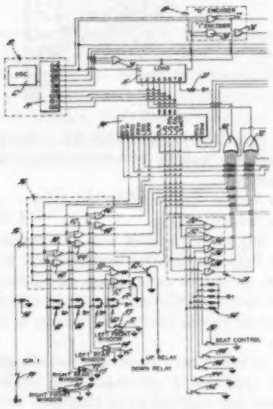
Filed Jun. 30, 1978, Ser. No. 920,994
Int. Cl.[2] G08C *15/12*
U.S. Cl. 179—1 VE **7 Claims**

6. A time division multiplexing system for an automobile having first and second manually operated control switches at first and second locations respectively within the automobile and a load device intended to be operated independently by either of said switches, said system comprising:

transmitter means mounted at said first location, receiver means mounted at said second location and bidirectional transmission line means interconnecting said transmitter means with said receiver means,

said transmitter means transmitting serial time division multiplexed information in successive time slots in a pulse width modulated format, respective ones of said time slots containing address bits and data bits, one of the time slots containing address bits assigned to the second control switch and data bits having a pulse width representative of a zero binary state, another one of the time slots containing address bits assigned to said load device,

receiver means at said second location including means responsive to the address assigned to said second control



switch for lengthening the pulse width of at least one of said zero state data bits in response to actuation of said second control switch,

said transmitter means further including storage means for storing the data bits supplied by the receiver means, said transmitter means further including means responsive to actuation of said first control switch or the state of said storage means for supplying data bits indicative of the status of said first or second control switches during the time slot containing the address of said load device,

said receiver means responsive to receipt of the address assigned to said load device for controlling said load device in accordance with the accompanying data bits whereby said load device is actuable independently by either of said control switches.

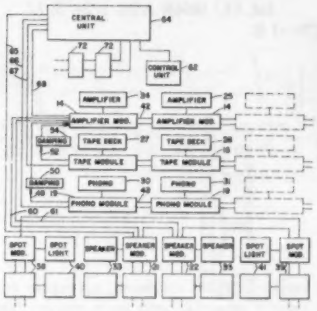
4,176,251

MODULAR SWITCHING SYSTEM

Lars Odlen, Lund, and Anders Hansson, Trelleborg, both of Sweden, assignors to Transcale A.B., Vasteras, Sweden

Filed May 15, 1978, Ser. No. 905,888
Int. Cl.[2] H04Q *5/00*
U.S. Cl. 179—1 SW **21 Claims**

1. A logic circuit responsive to a train of address pulses in accordance with its position in a cascade of similar logic circuits comprising address terminal means, transfer terminal means, means responsive to said train of address pulses at said address terminal means for subtracting one of said pulses and passing the remainder to said transfer terminal means, and



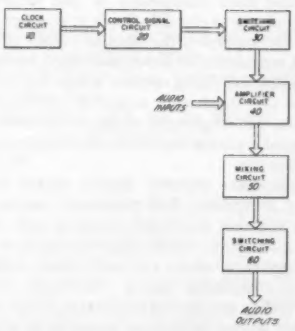
means responsive to the receipt of only a single pulse at said address terminal means for providing an output signal.

4,176,252

MULTI-DIMENSIONAL AUDIO PROJECTOR

Steven J. E. Dutkovich, Los Angeles, Calif., assignor to Dutko Incorporated, Los Angeles, Calif.

Filed Nov. 22, 1977, Ser. No. 854,041
Int. Cl.[2] H04R *5/00*
U.S. Cl. 179—1 G **20 Claims**



15. A multi-dimensional signal distribution device having

input means adapted to receive at least one input signal,

output means adapted for connection to a plurality of output devices for defining a first information plane,

control signal means,

variable gain amplifier means responsive to said input means and connected to said output means for amplifying said input to an amplitude determined by said control signal means to move said first information plane.

4,176,253

CURRENT LOADED PNEUMATICALLY DRIVEN LOUDSPEAKER ARRANGEMENTS

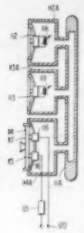
Saad Z. M. Gabr, 81 Old Dover Rd., Canterbury, Kent, England

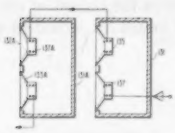
Continuation-in-part of Ser. No. 827,313, Aug. 24, 1977, abandoned. This application Apr. 28, 1978, Ser. No. 901,147

Claims priority, application United Kingdom, May 20, 1977, 21383/77

Int. Cl.[2] H04R *1/22, 1/24, 3/12*

U.S. Cl. 179—1 E 3 Claims





1. A loudspeaker assembly comprising a first enclosure, first and second loudspeakers each having a diaphragm means, each said first and second loudspeaker being different from the other as to the frequency range to which it responds and as to its efficiency at various frequencies, means mounting said first and second loudspeakers in said first enclosure with said diaphragm means thereof pneumatically coupled together within said first enclosure, an electro-mechanical transducer driven by said diaphragm means of said second loudspeaker, a second enclosure, a third loudspeaker having a diaphragm means, means mounting said third loudspeaker in said second enclosure, means for applying an electrical input to said first loudspeaker, and means for supplying the electric output of said electro-mechanical transducer to drive said third loudspeaker, said second loudspeaker being driven solely by said pneumatic coupling of said diaphragm means of said first and second loudspeakers, said diaphragm means of said first, second and third loudspeakers being exposed to the outside of said first and second enclosures.

2. A loudspeaker assembly having chassis means, a first loudspeaker comprising first diaphragm means, first means suspending said first diaphragm means in said chassis means, electro-mechanical transducer means adapted to act between said first diaphragm means and said chassis means, a second loudspeaker comprising second diaphragm means, second means suspending said second diaphragm means in said chassis, said first and second diaphragm means being acoustically exposed to each other in the interior of a closed chamber within said chassis means, said transducer means driving said first diaphragm means and said first diaphragm means pneumatically driving said second diaphragm means and being the sole drive of said second diaphragm means, a current-consuming device loading said second diaphragm means, and a partition subdividing said chamber into two compartments one individual to each said diaphragm means, said compartments communicating directly with each other past said partition within said chamber.

4,176,254

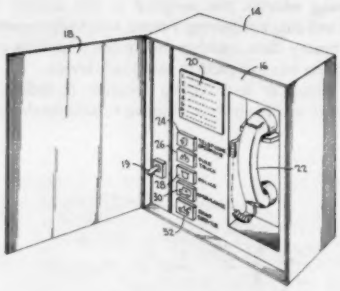
EMERGENCY ROADSIDE TELEPHONE SYSTEM

Lauren P. Tuttle, Herndon, and Paul H. Dluehosh, Manassas, both of Va., assignors to Telcom, Inc., Vienna, Va.

Filed Dec. 27, 1977, Ser. No. 864,869

Int. Cl.[2] H04M *11/04*

U.S. Cl. 179—5 R 8 Claims



1. An emergency telephone terminal for use in an emergency roadside telephone system to communicate with a central station comprising

transmitter means and receiver means for communicating with the central station;

a handset having a receiver and a transmitter and being movable between on-hook and off-hook positions;

first circuit means for connecting said handset transmitter with said transmitter means and said handset receiver with said receiver means when said handset is in said off-hook position;

a plurality of emergency switches symbolically marked with pictorial symbols to correspond to various emergency conditions and adapted to be manually actuated; and

second circuit means responsive to said handset being in said off-hook position for coupling said emergency switches with said transmitter means whereby said emergency telephone terminal permits voice and emergency switch communications with said central station.

4,176,255

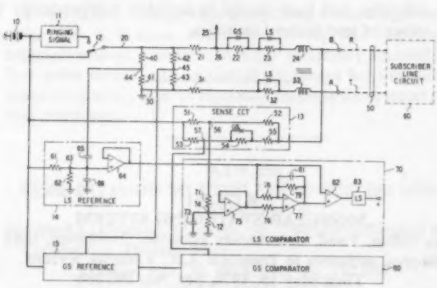
ADJUSTABLE IMPEDANCE BATTERY FEED CIRCUIT

John A. Rudisill, Jr., Flanders, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 24, 1978, Ser. No. 889,859

Int. Cl.[2] H04M *1/76, 19/00*

U.S. Cl. 179—16 F 10 Claims



1. A battery feed circuit of the type having first and second circuit paths for supplying direct current from a source of direct current potential to a transmission line and including line build-out impedance elements serially connected in circuit in the first and second circuit paths for limiting the magnitude of

the supplied current, CHARACTERIZED BY, means responsive to first control signals and supplied with a potential developed between the source of direct current potential and a prescribed circuit point in the battery feed circuit for generating a first signal which is a controllably adjusted predetermined portion of said developed potential, means responsive to said first signal for generating first control signals, and at least first controllable line build-out impedance means responsive to said first control signals and being serially connected in circuit in the first circuit path between said source of potential and said prescribed circuit point and being responsive to said first control signals for adjusting the line build-out impedance value in the battery feed circuit thereby controllably limiting the magnitude of current supplied to the transmission line.

4,176,256
CIRCUIT ARRANGEMENT FOR TIME-DEPENDENT MONITORING OF THE STATE OF LINES

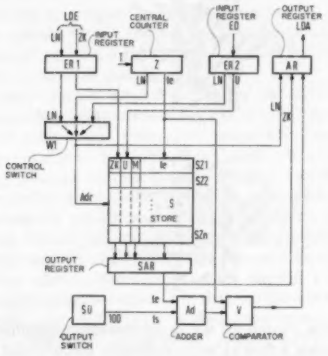
Albert Fruth, Germering, and Jürgen Harenberg, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 28, 1978, Ser. No. 919,824

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1977, 2732392

Int. Cl.[2] H04M *3/22*

U.S. Cl. 179—18 FG **5 Claims**



1. Circuit arrangement for the time-dependent monitoring of the states occurring on lines, comprising a device in which, on the occurrence of a change in state on a line, a line address which identifies the line and a state criterion which indicates the change in state are formed, comprising a store, a central counter, a control switch, a store which can be operated via said control switch by a line address, by a count of said central counter or by an address input, said store having a plurality of sets of storage cells which are each assigned to a line, there being an input for the store criterion, a monitoring criterion which indicates the monitoring, and an event time which indicates the time of the occurrence of the change in state, all said storage cells of said store being consecutively interrogated under the control of said central counter, and following each interrogation cycle which covers all the storage cells, the value of said event time being increased by 1 in accordance with the current count of said central counter, the interrogation result being logic-linked in an adder circuit with a theoretical time which indicates the duration of the monitoring, and a comparator being provided in which the result formed in said adder circuit is compared with the current count of said central counter and which in the case of a positive comparison emits an item of message information which comprises the relevant line address and the state criterion.

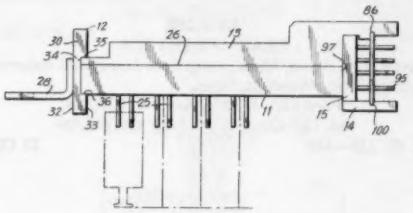
4,176,257
TELEPHONE CONNECTOR BLOCK

Paul V. DeLuca, Syosset, N.Y., assignor to Porta Systems Corp., Syosset, N.Y.

Filed Jun. 20, 1978, Ser. No. 926,574

Int. Cl.[2] H04Q *1/02*; H01R *9/00*

U.S. Cl. 179—98 **3 Claims**



1. Improved telephone connector block structure comprising: a generally planar main panel element having a pair of oppositely disposed principal surfaces, mutually interconnected connector pins projecting from each of said surfaces, said panel elements having an end edge surface interconnecting with said pair of surfaces; a pin block element of generally planar configuration and having first and second oppositely disposed principal surfaces, said first surface being mounted upon said end edge surface, there being a plurality of connector pins extending from said second surface, the axes of said pins lying in plane substantially parallel to the plane of said panel element; and a plurality of jumper conductors interconnecting at least some of the pins on one of said pair of principal surfaces with corresponding pins on said pin block element; a cover element overlying said last-mentioned jumper conductors, and an edge surface of said pin block element; said cover element extending past said pin block element and defining a groove, a support element carried by said pin block element on a side opposite that contacting said cover element and defining a second oppositely disposed groove; and a pin comb marking member having first and second side edges, each disposed within one of said grooves, said marking member having transversely extending slots therein, each slidably engageable with individual rows of pins on said pin block element.

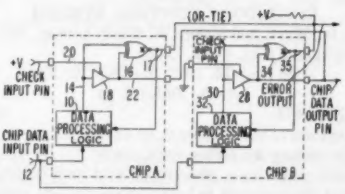
4,176,258
METHOD AND CIRCUIT FOR CHECKING INTEGRATED CIRCUIT CHIPS

Daniel K. Jackson, Hillsboro, Oreg., assignor to INTEL Corporation, Santa Clara, Calif.

Filed May 1, 1978, Ser. No. 901,527

Int. Cl.[2] G01R *31/28*

U.S. Cl. 235—302 **10 Claims**

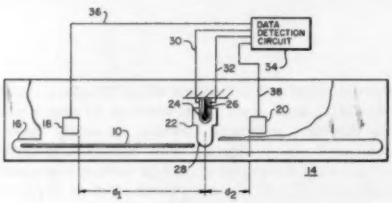


1. The method of checking integrated circuit chips having data processing logic and error-checking circuitry on each chip, each chip having off-chip outputs connected in parallel with the off-chip outputs of one or more other chips, comprising:

inputting data from substantially identical sources to the data processing logic on each chip;

outputting data from said logic on each chip to its error-checking circuit and to its off-chip output;
inhibiting the off-chip output of one of said chips so that said data does not reach said off-chip output; and
connecting said off-chip output of each chip to its own error-checking circuit, so that data generated internally on said one chip may be checked with respect to data generated externally from the other chip.

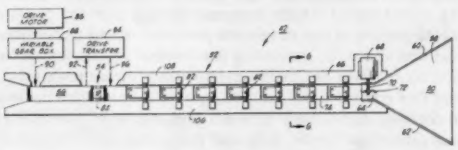
4,176,259
READ APPARATUS
Ernest P. Lee, Acton, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.
Filed Oct. 4, 1976, Ser. No. 729,336
Int. Cl.[2] G06K *7/08, 7/10;* **G11B** *5/09*
U.S. Cl. 235—449 **21 Claims**



1. Apparatus for processing bits of information recorded on a magnetic medium wherein the magnetic medium is being moved at a variable speed, wherein both the bit cell time period and the time of occurrence of an information bit within the bit cell time period may vary, said apparatus comprising:
means for reading the bits of recorded information so as to produce a single train of spaced pulses having variable spaces therebetween said pulses corresponding to each magnetic flux reversal sensed;
timing means, responsive to the train of spaced pulses, for producing a train of first timing pulses and a train of second timing pulses, said first and second timing pulses being operative to define separate portions of variable bit cell lengths of time;
means for detecting the binary value of successive bits of recorded information, said detecting means being responsive to the train of first timing pulses;
means, responsive to the second timing pulses, for storing the binary values of the detected bits of recorded information; and
character recognition means, responsive to the second timing pulses, for counting the detected bits of recorded information, said character recognition means being operative to recognize when a full character of information has been detected.

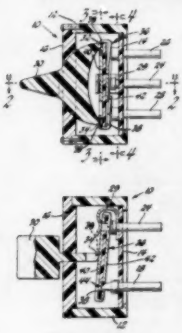
4,176,260
INVENTORY CONTROL SYSTEM
Theodore W. Ward, and Danny W. Ward, both of 2314 S. Central, Oklahoma City, Okla. 73129
Filed May 16, 1977, Ser. No. 797,324
Int. Cl.[2] B65H *3/04*
U.S. Cl. 235—475 **10 Claims**

1. In a system of business stock inventory accounting, coded item ticket sorting apparatus, comprising:
means for receiving a plurality of said item tickets and directing flow of such tickets to a constricted area;
rotational drive means and resilient finger means contacting said item tickets for moving said item tickets through the constricted area in reduced quantity;
channel means receiving said item tickets from the constricted area and conveying said tickets linearly along a narrow channel that is approximately as wide as said item tickets;
plural contacting means disposed along said narrow channel to contact said item tickets passing thereby to insure passage of but a single item ticket at a time in emergence from said narrow channel;



transparent plate means that is smaller in length than said item tickets receiving said tickets thereacross upon emergence from said narrow channel; and
deposit conveyor means carrying said item tickets away from said transparent plate means.

4,176,261
ELECTRIC SWITCH FOR MOTOR REVERSING
Peter C. Epple, Harper Woods, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Jun. 16, 1978, Ser. No. 916,105
Int. Cl.[2] H01H *9/00;* **HO1H** *21/24*
U.S. Cl. 200—1 V **2 Claims**



1. An electric switch for use in selectively controlling energization of either a first or second electric circuit, said switch comprising a housing having a base member and a cover member, two rows of first, second and third terminals carried by said base member, said terminals being spaced from each other and each having a conducting surface facing interiorly of said housing with the conducting surface of one of said second terminals extending interiorly beyond the other terminals, an actuator button pivotally mounted in said cover member, oppositely disposed actuator elements formed on said actuator button and extending interiorly of said housing, a contact assembly including an insulator disc adapted to being normally engaged at adjacent opposite edge portions thereof by said oppositely disposed actuator elements, first and second contact strips carried by said disc across opposite sides thereof in a criss-crossing pattern with the ends of each contact strip folded onto the opposite side of said disc in a spaced relationship with the other contact strip, a spring element secured at one end thereof to said base member by the other of said second terminals so as to engage said first contact strip and normally urge said second contact strip into pivotal contact with said one of said second terminals and said first and second contact strips into contact with the first and third terminals adjacent said other of said second terminals, said disc being selectively pivotable about said one of said second terminals and either said first or third terminals adjacent the other of said second terminals by manual movement of said actuator button in one direction or the other so as to bring one of said first and second

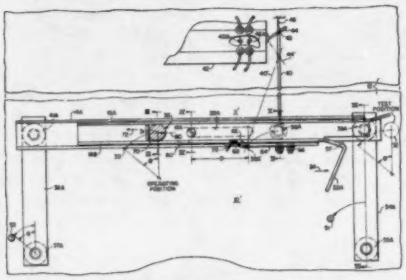
contact strips into engagement with the other of the first or third terminals to provide a conductive path between respective first or third terminals and thereby complete one of said first or second electric circuits.

4,176,262

AUTOMATIC FAIL-SAFE MECHANISM-OPERATED CELL SWITCH FOR METAL-CLAD SWITCHGEAR

James W. McMillen, Wilkins Township, Allegheny County, and Anthony Tomeo, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 14, 1977, Ser. No. 806,396
Int. Cl.[2] H01H *9/20*
U.S. Cl. 200—50 AA **5 Claims**



1. Circuit interrupter apparatus, comprising:

(a) a cabinet having spaced fixed terminals which are interconnected with a circuit which is to be opened and closed in a controlled manner;

(b) main circuit interrupter means movable between an operating position and a test position within said cabinet, said main circuit interrupter means being interconnected electrically with said fixed terminals when in said operating position to thus open and close said circuit as the separable main contacts of said main circuit interrupter means are opened and closed respectively, said main circuit interrupter means being disconnected electrically from said fixed terminals when in said test position, said main circuit interrupter means having a lever means which moves in response to the operation of said separable main contacts between a first lever position when said separable main contacts are opened and a second lever position when said separable main contacts are closed;

(c) auxiliary contact means disposed within said cabinet, said auxiliary contact means having a contact actuating member;

(d) motion transfer support means movably disposed within said cabinet means, said motion transfer support means being interconnected with said auxiliary contact actuating member for moving said actuating member; and

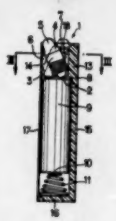
(e) extender means slidably disposed upon said motion transfer support means in either of a first or second slidable position, said extender means being in said first slidable position and in a disposition of mechanical interlinkage with said lever means when said main circuit interrupter means is in said operating position to thus cause said auxiliary contact means to be actuated to change state as said lever means is moved between said first and said second lever positions, said extender means remaining in said first slidable position and not in a disposition of mechanical interlinkage with said lever means when said main circuit interrupter means is in said test position unless said extender means has been manually moved to said second slidable position in which case it becomes mechanically interlinked with said lever means to thus cause said auxiliary contact means to be actuated to change state as said lever is moved between said first and said second lever means positions, said extender means always being driven to said first slidable position by said lever means as said main circuit interrupter is moved to said operating position.

4,176,263

SWITCH FOR POCKET TORCH

Jean-Pierre Rousseau, 4, Andersen, L'Oree de Senart, 91210 Draveil, France

Filed Dec. 23, 1977, Ser. No. 863,735
Claims priority, application France, Jan. 11, 1977, 77 00618
Int. Cl.[2] F21V *23/00*
U.S. Cl. 200—60 **6 Claims**



1. A flashlight comprising

a casing,

means defining an elongated slot extending through said casing,

a light bulb in said casing, said bulb having a lens end having a tip surrounded by a shoulder,

said tip extending into the slot from within the casing and being exposed for manual manipulation from outside the casing,

and said shoulder engaging the casing at each side of the slot to retain the bulb in the casing,

said bulb having a base with an end terminal and a side terminal,

means defining a generally parallelepedic space in said housing for guiding said bulb between a first position and a second position,

a battery in the casing,

a conductive terminal in said casing engaging said end terminal of said bulb and connecting the bulb to a first terminal of the battery,

resilient means for urging said terminal toward said bulb,

a conductive element in said casing at one side of said space for engaging said bulb in said first position and for connecting said side terminal of the bulb to a second terminal of the battery,

insulating means in said casing at the other side of said space for insulating said bulb from said second terminal in said second position of said bulb,

said slot, parallelepid space, conductive terminal, and resilient means comprising means mounting said bulb for snap over center movement between said first and second positions in response to manual manipulation of said exposed tip of the bulb so that the bulb remains in its manually set position and functions as the switch of the flashlight.

4,176,264

LINEAR PROGRAMMER FOR AN ACTUATOR

David Tann, Detroit, Mich., assignor to Electro-Mechanical Products, Detroit, Mich.

Continuation of Ser. No. 711,433, Aug. 4, 1976, abandoned. This application Apr. 17, 1978, Ser. No. 897,100
Int. Cl.[2] H01H *35/38*
U.S. Cl. 200—82 E **5 Claims**

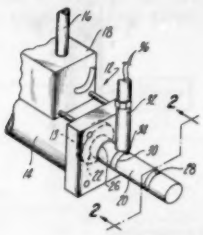
1. A linear programmer arrangement in combination with an actuator, said actuator including:

a movable actuator member;

means supporting said actuator member for linear movement, including a housing and bearing means slidably receiving a portion of said actuator member for movement into and out of containment by said housing;

at least one programming insert mounted within a recess formed in said portion of said actuator member and configured to be flush with the surface thereof so as to be able to be slidably received by said bearing means, said programming insert being formed from a different material than said movable actuator member;

responder means mounted to be fixed with respect to said movable actuator member and having a portion adjacent said actuator portion in line with said actuator portion and located to come into juxtaposition with said programming



insert during said movement of said actuator member, said responder means including means generating an electrical signal in response to said programming insert coming into juxtaposition with said responder portion, whereby said electrical signal is generated whenever said movable actuator member is in a predetermined relationship with said housing member corresponding to the position of said programming insert,

wherein said movable actuator member comprises a piston head and a piston shaft slidably supported in said bearing means and wherein said programming insert is recessed into the surface of said piston shaft and having an outer surface thereof flush with respect to the surface of said shaft circumference, whereby said programming insert is moved through said bearing means.

4,176,265

ILLUMINATED ELECTRIC SWITCHES

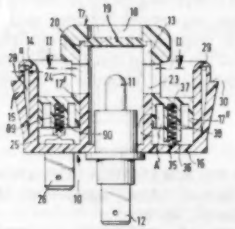
Dietmar Mobus, Trebur; Günter Ehrenberger, Rüsselsheim, and Wolfgang Jobst, Nauheim, all of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 27, 1977, Ser. No. 864,635

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1977, 2702839

Int. Cl.[2] H01H *9/18*

U.S. Cl. 200—316 **3 Claims**



1. A rotary switch provided with a light source for indicating the location of the switch when installed, and its condition, said rotary switch comprising a stationary carrier member including a base plate having concentric outer and inner cylindrical walls integrally formed therewith and extending therefrom so as to provide a space therebetween, a manually operable switch knob having a hollow cylinder portion mounted for rotation about said inner cylindrical wall between an "OFF" position and an "ON" position, a radially extending flange formed with said cylinder portion and extending between said inner and outer cylindrical walls so as to fill said space therebetween, a tubular housing integrally formed with said flange, detent means located within said tubular housing and cooperating with a recess formed in said base plate for maintaining said switch knob in said "OFF" and "ON" positions, a light bulb supported by said base plate and located within said inner cylindrical wall and said cylinder portion of said switch knob, said switch knob having a first opening formed therein to permit light rays emitted by said light bulb to be projected through said opening longitudinally of said cylinder portion so as to indicate the location of the rotary switch, and said inner cylindrical wall and said switch knob having apertured portions adapted to receive light projected laterally of said inner cylindrical wall from said bulb and arranged so that rotation of said switch knob brings the apertured portion of the switch knob into and out of radial alignment with the apertured portion of said inner cylindrical wall and effects a simultaneous change in the visible aspect of an indicator region of the switch, between said outer cylindrical wall and said cylindrical portion of the switch knob, which is illuminable by said light projected laterally from said bulb, and thereby indicates to a viewer that the switch is in an "ON" or "OFF" condition.

4,176,266

MICROWAVE HEATING APPARATUS

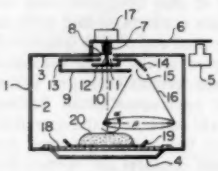
Yoichi Kaneko, Tokorozawa, and Katsuhiro Kimura, Tokyo, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 27, 1977, Ser. No. 763,088

Claims priority, application Japan, Feb. 2, 1976, 51-10143

Int. Cl.[2] H05B *9/06*

U.S. Cl. 219—10.55 F **15 Claims**



1. Heating apparatus wherein an article to-be-heated placed in an oven is irradiated by microwaves from a microwave source and is thus heated, comprising:

means for generating a microwave beam, and

means to relatively rotate the microwave beam with respect to an article to-be-heated about an axis of rotation and to impart heating energy to the article to-be-heated, the microwave beam having an energy pattern distributed in a plane perpendicular to the rotational axis in such a manner as to be more narrow in an angular direction with respect to the axis of rotation than in a radial direction with respect to the axis of rotation.

4,176,267

MICROWAVE ENERGY TRAP

Werner Rueggeberg, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed May 12, 1978, Ser. No. 905,295

Int. Cl.[2] H05B *9/06*

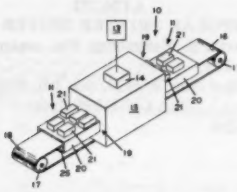
U.S. Cl. 219—10.55 A **5 Claims**

1. A microwave energy trap for use in conjunction with a microwave oven having a conductive enclosure wherein materials are treated with microwave energy, the enclosure having

access ports and a conveyor means passing through the access ports and conductive enclosure, said energy trap comprising:

(a) a tunnel means with walls enclosing one of the access ports of said oven outside of said enclosure, said conveyor means passing through the tunnel means;

(b) a plurality of resonant slot means passing through one or more of the walls of said tunnel means;



(c) a plurality of closed waveguide chamber means disposed on the outside of said tunnel means over said resonant slot means for entrapping microwave energy; and

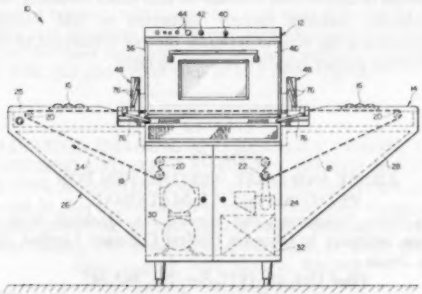
(d) a plurality of energy absorbing means disposed within said waveguide chamber means for dissipating microwave energy.

4,176,268

SYSTEM FOR HEATING USING A MICROWAVE OVEN ASSEMBLY AND METHOD

John E. Gerling, Cupertino, Calif., assignor to Gerling Moore, Inc., Santa Clara, Calif.

Filed Mar. 15, 1978, Ser. No. 886,885
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 A **23 Claims**



1. A microwave oven assembly, comprising:

(a) a housing defining an internal chamber for heating articles therein and including at least one vertically extending opening for passage of said articles into and out of said chamber;

(b) means for producing microwave energy within said chamber for heating said objects therein;

(c) a first L-shaped door section fixedly connected with said housing and including

(i) a vertical subsection positioned around said opening, and

(ii) a horizontal subsection extending from the bottom edge of said vertical subsection away from said opening;

(d) a second L-shaped door section connected with said housing for movement between a first position a sufficient distance from said opening to allow said articles to pass readily therethrough and a second position for closing said opening to the passage of said articles, said movable door section including

(i) a vertical subsection having a surface which is located in confronting relationship with a surface on the vertical subsection of said fixed door section and extending across said opening when said movable section is in its closed position, and

(ii) a horizontal subsection having a surface which is located in confronting relationship with a surface on the horizontal subsection of said fixed door section when said movable section is in its closed position;

(e) said door sections together defining a gap extending between said horizontal subsections and into said opening when said movable door section is in its closed position, said gap being sufficiently large to allow an object carrying conveyance mechanism to extend into said chamber through said gap;

(f) means for moving said movable door section between its open and closed positions, and

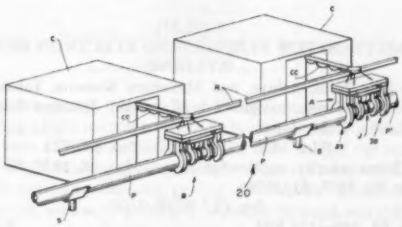
(g) seal means for reducing the amount of microwave energy escaping from within said heating chamber along the periphery of said movable door section and said gap to a level below a predetermined standard when said movable section is in its closed position.

4,176,269

CLAMPING APPARATUS FOR WELDING CIRCUMFERENTIAL ARTICLES

George J. Merrick, Franklin; George E. Cook, Brentwood, and Donald D. Modglin, Nashville, all of Tenn., assignors to Merrick Welding International, Inc., Nashville, Tenn.

Division of Ser. No. 654,975, Feb. 3, 1976, Pat. No. 4,145,593.
This application Dec. 5, 1977, Ser. No. 857,226
Int. Cl.[2] B23K 9/02
U.S. Cl. 219—60 A **10 Claims**



1. Apparatus for welding a circumferential joint interconnecting adjacent lengths of pipe which have an outer protective layer, comprising:

first means for selectably clamping onto said outer protective layer of said adjacent lengths of pipe so as to be supported by said pipe lengths while spanning said joint;

second means supported by said first means for a limited extent of movement in plural degrees of freedom relative to said first means to permit said second means to assume a certain alignment with a joint that may be angularly and axially misaligned relative to said outer protective layer on the pipe;

clamp means carried by said second means for clamping said second means to portions of said lengths of pipe lacking said protective layer and in fixed relation to said joint,

track means carried by said second means and defining a predetermined path of movement in proximate circumferential relation to said joint,

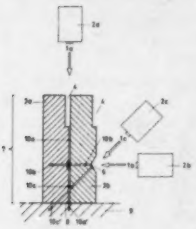
carriage means supported for movement about said track means; and

welding torch means carried by said carriage means in welding relation with said joint.

4,176,270
ROLL AND ROLL-MANUFACTURING METHOD

Vaino Sailas, Vaajakoski, Finland, assignor to Valmet Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 802,316, Jun. 1, 1977, Pat. No. 4,104,773. This application Jun. 10, 1977, Ser. No. 805,460
Claims priority, application Finland, Jun. 15, 1976, 761730
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 EM 13 Claims

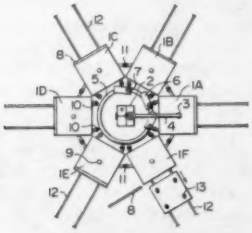


1. In a method of manufacturing a roll of the type which is used in a paper machine, comprising the steps of surrounding an inner roll body with a plurality of outer strip portions which are distributed along the axis of the roll body, which engage the exterior surface thereof, and each of which extends circumferentially around the roll body, each of said strip portions having side surfaces with the side surfaces of successive strip portions engaging each other defining an interface between adjacent strip portions so as to provide a covering which covers the entire exterior surface of said inner roll body, and welding the successive strip portions simultaneously to each other and to said roll body surface by an electron beam for preventing them from moving apart from each other at least in the direction of the axis of said inner roll body.

4,176,271
METHOD FOR PERFORMING ELECTRON BEAM WELDING

Kiyohide Terai, Ashiya, and Muneharu Kutsuna, Takarazuka, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Mar. 17, 1978, Ser. No. 887,721
Claims priority, application Japan, Mar. 18, 1977, 52/29292; Mar. 18, 1977, 52/29294
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 EM 6 Claims

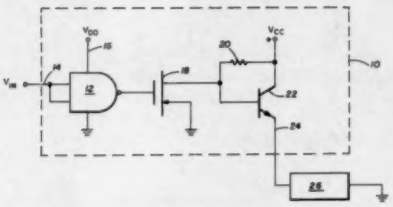


1. Method for electron beam welding including steps of placing parts to be welded in a welding chamber, evacuating the chamber, welding the parts together at a junction therebetween by energizing an electron beam gun mounted on the chamber so that an electron beam is applied to the parts at the junction, opening the chamber and taking the welded parts out of the chamber, the improvement comprises the fact that a plurality of fixed chambers each separated one from another are provided for operation with different phases of said steps each separate fixed chamber being provided with receptacle means allowing quick connection and disconnection of the electron beam gun, and sequentially applying evacuation means and a single electron beam gun to the one of the chambers which is undergoing the welding step.

4,176,272
MOS-BIPOLAR PRINTER DRIVER CIRCUIT

Vernon B. Powers, St. Petersburg, Fla., assignor to E-Systems, Inc., Dallas, Tex.

Filed Nov. 3, 1977, Ser. No. 848,336
Int. Cl.[2] H05B 1/00
U.S. Cl. 219—216 9 Claims

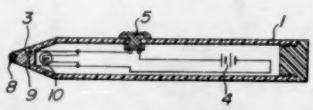


1. A thermal printer driver circuit connected to a thermal printer resistive heating element comprising:
- an MOS transistor having a binary input signal provided to the gate terminal thereof and having a first terminal grounded,
- a resistor connected between a second terminal of said MOS transistor and a voltage source, and
- a bipolar transistor having the base terminal thereof connected to said second terminal of said MOS transistor, the collector terminal thereof connected to said voltage source and the emitter terminal thereof connected to the thermal printer resistive heating element.

4,176,273
LIGHT AND HEAT WRITING PEN FOR PHOTOSENSITIVE MATERIAL

Tetsuo Fujie, Yokohama, and Hiromi Ito, Hachioji, both of Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan

Filed Oct. 18, 1977, Ser. No. 843,347
Claims priority, application Japan, Oct. 19, 1976, 51/140320[U]; Oct. 20, 1976, 51/125029
Int. Cl.[2] H05B 1/00; B43K 29/10
U.S. Cl. 219—220 2 Claims



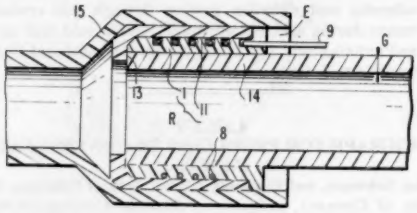
1. A writing pen for heat developing type photoconductive material comprising: a pen having a pen nib formed of material having good thermal conductivity and light-perviousness and adapted to be brought into contact with photosensitive heat developing type material; a light source in said pen for illuminating through said light pervious pen nib the photosensitive heat developing type material contacted by said pen nib; and a heater embedded in said pen nib and for heating at least a portion of said nib adapted to contact the photosensitive material to a predetermined temperature.

4,176,274

METHOD OF COUPLING PLASTIC PIPES BY WELDING AND A CONNECTION PIECE FOR COUPLING SAME

Noël Lippera, Blenod les Pont-A-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Apr. 20, 1977, Ser. No. 789,327
Claims priority, application France, Jun. 3, 1976, 76 17182
Int. Cl.[2] H05B 3/58
U.S. Cl. 219—522 3 Claims



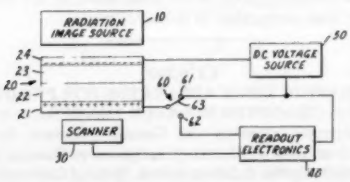
1. A connecting piece for electrical resistance welding of an inserted male end of one plastic pipe to the socket end of a second plastic pipe, said connecting piece constituting a sealing member interfitted between the male end and the socket end of said plastic pipes and comprising: two complementary concentric plastic rings fitted one to the other, said complementary rings comprising an internal ring having grooves on its radially exterior periphery, an electrical heating resistance element mounted within the base of said grooves, and an outer ring froming the sheath of the connecting piece and having an internal surface defining an attachment cavity which is cylindrical and smooth and having an inner diameter corresponding to the outer diameter of the inner ring, and wherein said internal ring is axially received by such outer ring and is concentric therewith, whereby said electrical heating resistance element is centered between said concentric pipe ends to insure by energizing said electrical heating resistance element uniform melting of the inner and outer rings and high integrity welding of the male end and socket ends of said pipes together.

4,176,275

RADIATION IMAGING AND READOUT SYSTEM AND METHOD UTILIZING A MULTI-LAYERED DEVICE HAVING A PHOTOCONDUCTIVE INSULATIVE LAYER

Donald M. Korn, Denmark Township, Washington County, and Owen L. Nelson, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 22, 1977, Ser. No. 826,369
Int. Cl.[2] H01J 31/50
U.S. Cl. 250—213 R 14 Claims



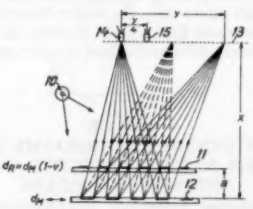
1. A system for establishing an electrostatic charge image and then providing a readout of the image including a multilayered photoconductive device including a first conductive layer, an insulative layer, a photoconductive insulative layer and a second conductive layer in that order wherein at least the latter three layers are successively contiguous; a D.C. voltage source for providing a high electric field between said first and second conductive layers; a radiation image source for exposing the device to a radiation image with the D.C. voltage source operatively connected between said first and second conductive layers to produce an electrostatic charge image at a layer of the device; and a scanner for scanning the device with readout radiation and readout electronics operatively connected in series with said D.C. voltage source, such series combination operatively connected between said first and second conductive layers when the scanner is scanning the device whereby the readout electronics detects the charge flow caused by readout radiation from said scanner.

4,176,276

PHOTOELECTRIC INCIDENT LIGHT DISTANCE MEASURING DEVICE

Dietmar Kaul, Solms, and Jörg Willhelm, Nauborn, both of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Filed Nov. 23, 1977, Ser. No. 854,380
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1976, 2653545; Mar. 31, 1977, 2714324
Int. Cl.[2] H01J 3/14
U.S. Cl. 250—237 G 6 Claims



1. A photoelectric incident light distance measuring device, comprising a light source; a reflecting scale grating; a reference grating with a lattice constant differing from that of the scale grating; said reference grating being transparent and displaceable with respect to said scale grating; an air space between the two gratings; said scale grating illuminated through said reference grating; and a plurality of photoelectric receivers placed at intervals in the direction of the distance to be measured for scanning the scale grating through the reference grating whereby vernier strips are produced, and wherein at least two of said photoelectric receivers are arranged approximately at a distance "x", measured in the direction of the light, from the grating with the larger optically effective lattice constant, wherein:

$$x = a/v$$

with

a = optically effective air space between the reference and scale gratings;

$v = d_M(y + d_M)$ − distortion factor;

Y = distance of the vernier strips produced by the two gratings;

and with

d_M as the optically effective lattice constant of the scale grating, related to the optically effective lattice constant d_R of the reference grating by the relationship

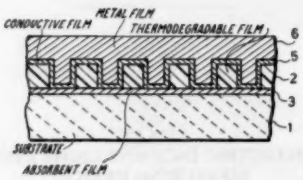
$$d_R = d_M(1 \pm v).$$

4,176,277

THERMOSENSITIVE DATA-CARRIER DESIGNED FOR THE RECORDING OF INFORMATION AND A METHOD OF RECORDING INFORMATION ON SUCH A DATA-CARRIER

Claude Bricot; Jean-Claude Dubois; Francois LeCarvennec; Jean-Claude Lehureau, and Henriette Magna, all of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Oct. 18, 1977, Ser. No. 843,508
Claims priority, application France, Oct. 22, 1976, 76 31867
Int. Cl.[2] G01C 5/16
U.S. Cl. 250—316.1 2 Claims



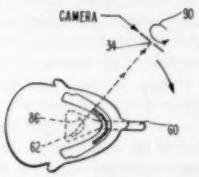
1. A thermo-sensitive data-carrier for the recording of information by etching with a concentrated recording radiation, comprising at least a thermo-sensitive film deposited upon a thermally insulating substrate, said thermo-sensitive film being formed by an absorbent film in contact with the substrate and a film thermodegradable at a temperature T_1, affixed to the absorbent film, the etching radiation incident upon the thermodegradable film passing through said film and being absorbed to a small extent only, the major absorption of it taking place in the absorbent film which converts said radiation into heat and selectively diffuses said heat to said thermodegradable film.

4,176,278

PANORAMIC DENTAL RADIOGRAPHY EMPLOYING INTRAORAL RADIATION SOURCE AND IMAGE INTENSIFYING MEANS

Robert H. Cushman, Princeton, N.J., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Oct. 30, 1978, Ser. No. 955,999
Int. Cl.[2] G01N 21/00, 23/00; G21K 5/06, 5/08
U.S. Cl. 250—439 P 12 Claims



1. In a machine for providing panoramic radiographs of dental arch structures of a patient seated in a chair which includes a cooperating chin rest assembly for maintaining head of said patient in a secured position and wherein a film holder assembly is provided with a slot in a front panel thereof, said slot being capable of permitting radiation passing through said dental arch structures to pass through said slot for activation of film carried by said film holder assembly, said machine including means for controllably continuously moving said film in said film holder assembly past said slot at a controlled rate of speed and other means for orbiting said slot and said film holder assembly about said dental arch structures of said patient, the combination therewith of the improvement thereto comprising

intraoral container means containing a radiation source,

pulley and lever means for effecting arcuate travel of said container means from one side of oral cavity of said patient to other side, said container means having an opening therein for passing radiation emitted by said radiation source therethrough while said container means rotatably scans said dental arch structures while disposed in oral cavity of said patient during said arcuate travel,

additional means cooperating with said other means for rotating said pulley and lever means for maintaining said opening in constant collimated alignment with said slot as said slot and film holder assembly orbit said patient whereby said radiation passing through said container means during said arcuate travel within said oral cavity and entering said slot continuously activates said film to provide said panoramic radiograph.

4,176,279

TOMOGRAPH FOR PRODUCING TRANSVERSE LAYER IMAGES

Günter Schwierz, and Wolfgang Häerer, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Apr. 14, 1978, Ser. No. 896,396
Claims priority, application Fed. Rep. of Germany, May 24, 1977, 2723401
Int. Cl.[2] A61B 6/00
U.S. Cl. 250—445 T 4 Claims

1. In a tomographic apparatus for producing transverse layer image of a radiography subject including a patient couch, a radiation measuring arrangement having a radiation source which produces a fan-shaped beam of rays penetrating the radiography subject, whose cross sectional extent perpendicular to the layer plane is equal to the layer thickness and in the layer plane is of such a magnitude that the entire radiography subject is penetrated, and having a radiation receiver consisting of a row of detector elements each of which is at least partially with is said fan shaped beam and which detects the radiation intensity behind the subject, a rotary drive device for the measuring arrangement and a measured value converter for the transformation of the signals supplied by the radiation receiver into a layer image, characterized in that the radiation receiver (2) is arranged so that its axis of symmetry (23*a*) and the axis of symmetry (24*a*) of the x-ray beam (4) are always at a distance from each other in the layer plane.

4,176,280

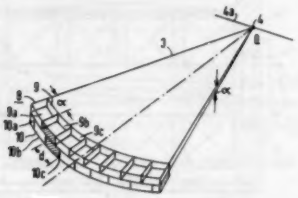
TOMOGRAPHIC X-RAY APPARATUS FOR PRODUCING TRANSVERSE LAYER IMAGES

Walter Greschat, Dormitz, and Guenter Schwierz, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 15, 1978, Ser. No. 886,958
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1977, 2717349
Int. Cl.[2] A61B 6/00
U.S. Cl. 250—445 T 6 Claims

1. Tomographic apparatus for producing transverse layer images of a radiographic subject, comprising an x-ray measuring arrangement including an x-ray source which produces a fan-shaped x-ray beam which penetrates the radiographic subject, the cross-sectional extent of which perpendicular to the layer plane is generally equal to the layer thickness, and a

radiation receiver which determines the intensity of radiation behind the subject; and a drive device for the measuring arrangement for producing rotary movements, and a measured value converter for transforming the signals supplied by the radiation receiver into a layer image, the radiation receiver being composed of a number of individual detectors, characterized in the radiation receiver (**8**, **17** to **20**) having two or



more detector rows (**9**, **10**; **19**, **20**) arranged adjacent and parallel to one another, the detectors (**9***a* etc.) of one detector row (**9**, **19**) overlapping the detectors (**10***a* etc.) of the other detector row (**10**, **20**) by approximately half the detector width (d), and a control device (**8***b*, **21**, **21***a*) for the radiation receiver (**8**, **17** to **20**) for actuating the same to selectively respond to the x-ray beam (**3**) by way of one of the detector rows (**9**, **10**, **19**, **20**) in each instance.

4,176,281

METHOD FOR ADJUSTING A SEMICONDUCTOR DISK RELATIVE TO A RADIATION MASK IN X-RAY PHOTOLITHOGRAPHY

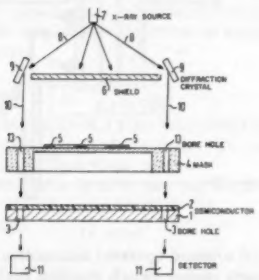
Peter Tischer, Strasslach, and Eckart Hundt, Haar, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Apr. 20, 1978, Ser. No. 898,480

Claims priority, application Fed. Rep. of Germany, May 20, 1977, 2722958

Int. Cl.[2] **A61K** *27/02*; **G01M** *21/00*

U.S. Cl. 250—492 A **3 Claims**



1. A method for the adjustment of a semiconductor disk relative to a radiation mask in x-ray photolithography, in which the semiconductor disk and the radiation mask are provided with adjusting marks corresponding with one another, and whereby the adjustment results with the aid of x-radiation and with one or several detectors sensitive to x-rays, characterized in that bores are utilized as adjusting marks for the semiconductor disk and the radiation mask, said bores completely penetrating the semiconductor disk and the photolacquer layer situated on the semiconductor disk and the radiation mask, respectively, the axes of said bores extending perpendicularly in relation to the surface of the semiconductor disk and of the radiation mask, characterized in that the adjustment proceeds with the aid of a pair of perpendicular x-ray beams whose paths extend in parallel to one another and perpendicular to the surface of the semiconductor disk and of the radiation mask, and characterized in that a point-shaped x-ray source is utilized for the adjustment and that two parallel x-ray beams are produced with the aid of two diffraction crystals.

4,176,282

2-DECARBOXY-2-ALKYLCARBONYL-3,7-INTER-M-PHENYLENE-3-OXA-4,5,6-TRINOR-PGF$_1$ COMPOUNDS

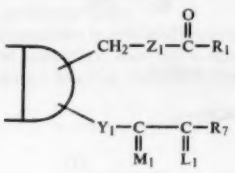
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 888,695, Mar. 21, 1978, Pat. No. 4,123,463. This application Jul. 17, 1978, Ser. No. 925,262

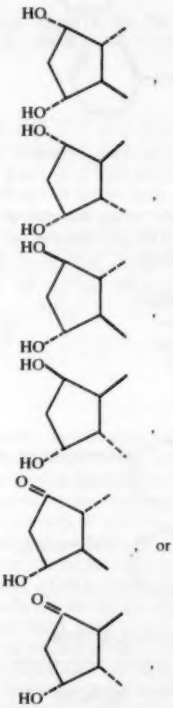
Int. Cl.[2] **C07C** *177/00*

U.S. Cl. 260—590 C **37 Claims**

1. A prostaglandin analog of the formula



wherein D is

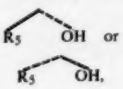


wherein R_1 is alkyl of one to 4 carbon atoms, inclusive; wherein L_1 is

or a mixture of

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;

wherein M_1 is

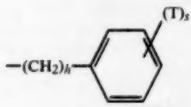


wherein

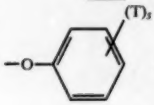
R_5 is hydrogen or methyl;

wherein R_7 is

(1) $-(CH_2)_m-CH_3-$,



(2)



(3)

wherein h is zero to three, inclusive, wherein m is one to 5, inclusive, s is zero, one, 2, or 3 and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms or alkoxy of one to 3 carbon atoms, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl;

wherein Y_1 is

(1) trans—CH=CH—,

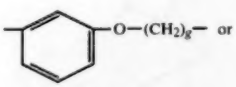
(2) cis—CH=CH—,

(3) $-CH_2CH_2-$, or

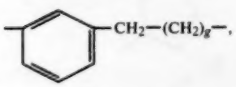
(4) —C≡C—; and

wherein Z_1 is

(1)



(2)



wherein g is one, two, or three.

4,176,283

WATER POWERED GENERATOR

Richard H. McLaren, 7280 Cloverblossom La. NE., Bremerton, Wash. 98310

Filed Nov. 23, 1977, Ser. No. 854,388

Int. Cl.[2] F01D *15/10*

U.S. Cl. 290—52 **3 Claims**

1. An electric generating device, comprising,

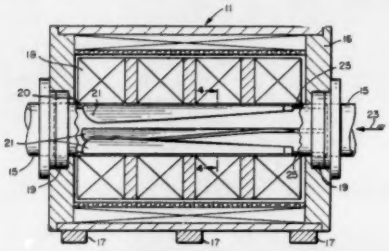
a stator,

an armature rotatable in a central opening in said stator and having therethrough an axial bore,

means rotatably mounting said armature in a water main coaxially thereof and

drive means mounted in the bore of said armature and responsive to the flow of water therethrough to impart rotation to said armature at a substantially constant rate,

said drive means comprising a plurality of resilient vanes



projecting radially inwardly into the bore in said armature to cause said rotation of the latter when water flows through said bore, and

each of said vanes being disposed to flex slightly in response to variations in the water pressure in said main thereby to allow said rotation of the armature to be substantially constant.

4,176,284

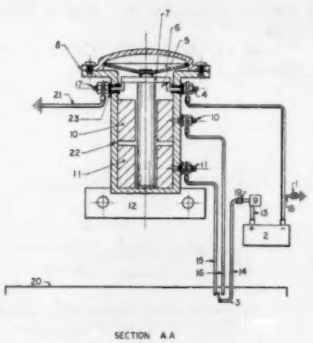
AUTOMOTIVE BATTERY POWER CIRCUIT BREAKER

Edward W. Higgs, 124 South 250 East, North Salt Lake City, Utah 84054

Filed Dec. 27, 1977, Ser. No. 864,485

Int. Cl.[2] H01H *35/14;* **H02H** *7/18*

U.S. Cl. 307—10 BP **3 Claims**



SECTION A A

1. A dual coil solenoid operated automotive battery power circuit disconnect master switch installed preferrably on the ground side of the battery and having a movable plunger with an integral contact ring and a belleville spring system, the contact ring being located such that disconnect or connect of battery power is effected due to its position with respect to the battery ground and vehicle ground terminal ends which extend through the solenoid body and are located within the inner cavity, and said solenoid having dual coils with windings in opposite circumferential direction such that the force imparted to the plunger due to current flow within the coils is in one direction for operation of one coil and in the opposite direction for current flow in the other coil, and each coil having a separate exterior terminal for attachment of a conductor lead from the vehicle ignition switch such that, depending on the selected position of the ignition switch be it clockwise or counterclockwise, one coil is energized to effect plunger movement for battery disconnect and the other coil is energized for battery connect, and which plunger has integral with it or acting

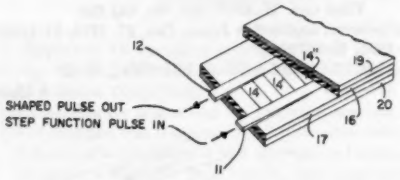
on it a belleville spring system which is capable of holding the plunger in the open or closed positions so that continuous solenoid power is not required to maintain the plunger position, the plunger position being determined by the solenoid coil last energized by the operator manipulating the ignition switch and which master switch having additional terminals for battery ground and vehicle ground and a solenoid body having a mounting provision, and which master swtich when open provides the desired result that no short circuit is possible at any device or accessory and not even at the positive or power terminal of the battery itself.

4,176,285

ELECTRICAL PULSE GENERATOR

Neil J. Norris, Santa Barbara, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 11, 1978, Ser. No. 868,584
Int. Cl.[2] H03K *3/02, 6/00*
U.S. Cl. 307—106 **5 Claims**



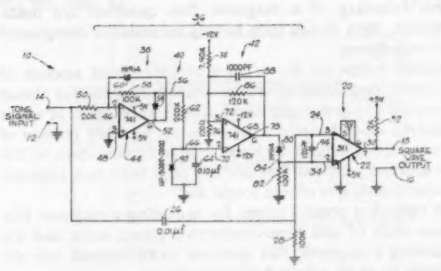
1. In a technique for generating a highly reproducible, high voltage, dynamic range electrical pulse having an increasing pulse amplitude as a function of time by a completely passive system, the apparatus comprising a ground plane, a pair of conductors of selected length separated from said ground plane by a suitable dielectric, and a plurality of entirely passive, entirely resistive elements positioned along said length each of which couples said pair of conductors, the conductance of each of said passive resistive elements increasing with position along said length whereby the application of a step function pulse to one of said conductors produces said pulse having an increasing pulse amplitude with time as an output at the other of said conductors.

4,176,286

SIGNAL TRANSLATOR WITH SQUELCH

Thomas E. Shuffield, Jr., N. Little Rock, Ark., assignor to BEI Electronics, Inc., Little Rock, Ark.

Filed Mar. 8, 1978, Ser. No. 884,599
Int. Cl.[2] H03K *5/153*
U.S. Cl. 307—237 **12 Claims**



1. A signal translator, comprising

a square wave generator including an operational amplifier having a tone signal input for receiving tone signals and a square wave output for delivering square wave output signals corresponding to said tone signals,

said operational amplifier having a switching input for receiving a first control voltage for activating said amplifier and a second control voltage for squelching said amplifier,

and squelch control voltage generating means for receiving said tone signals and producing said first control voltage when said tone signals exceed a predetermined level while producing said second control voltage when said tone signals are less than said predetermined level,

said squelch control voltage generating means including control signal producing means for converting said tone signals into a corresponding control signal,

and comparator means for receiving said control signal and producing said first control voltage when said control signal exceeds an established level while producing said second control voltage when said control signal is less than said established level,

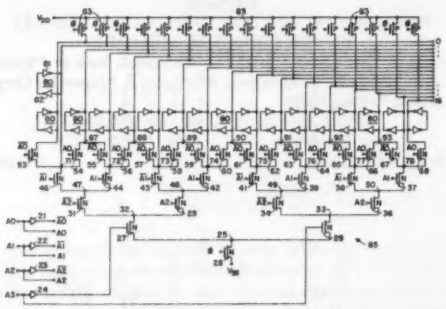
whereby said amplifier is activated when said control signal exceeds the established level but is squelched when said control signal is less than the established level.

4,176,287

VERSATILE CMOS DECODER

James J. Remedi, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 13, 1978, Ser. No. 896,071
Int. Cl.[2] H03K *17/60, 5/18, 13/00*
U.S. Cl. 307—251 **13 Claims**

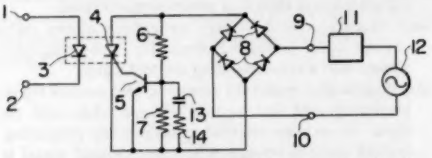


1. A two of n decoder for decoding a digital signal where n is the number of outputs of the decoder and is a function of the number of bits in the digital signal being decoded, comprising: first controllable means for precharging a first node to a first voltage potential; a plurality of second controllable means for controllably precharging each of the decoder outputs to a second voltage potential, the plurality of second controllable means being equal to n; a first plurality of transistors controllable by at least significant bit of the digital signal, the first plurality of transistors being equal to n-1; a second plurality of transistors coupled to the first plurality of transistors and controllable by a most significant bit of the digital signal, the second plurality of transistors being equal to two; and at least a third plurality of transistors coupled between the plurality of first and second transistors, the at least a third plurality of transistors being controllable by bits of the digital signal between the least and the most significant bits, the at least a third plurality of transistors being equal to n-1 divided by two, the first, second and third plurality of transistors being coupled in series between the first node and the outputs for forming a controllable path between the first node and a predetermined two of the outputs.

4,176,288
ZERO VOLTAGE SWITCHING SOLID STATE RELAY

Isamu Komatsu, Takahagi; Toru Sugawara, and Tsukasa Yamauchi, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 6, 1977, Ser. No. 830,663
Claims priority, application Japan, Sep. 6, 1976, 51-107145
Int. Cl.[2] H03K *17/72*
U.S. Cl. 307—252 A **8 Claims**

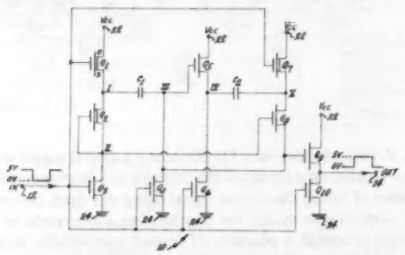


1. In a zero voltage switching solid state relay having a semiconductor controlled rectifier element which is ignited by an external control signal to feed a load with an alternating current, a transistor whose collector and emitter are respectively connected to the gate and the cathode of said semiconductor controlled rectifier element, and a voltage divider including first and second resistors connected in series across said rectifier element, the point of connection of said resistors being connected to the base of said transistor; the improvement comprising: a capacitor and a resistor connected in series between the base and the emitter of said transistor and which has a time constant sufficient to attain a hysteresis characteristic, and said semiconductor controlled rectifier element is a photothyristor which is operated by a light emitting diode adapted to emit light by the external control signal.

4,176,289
DRIVING CIRCUIT FOR INTEGRATED CIRCUIT SEMICONDUCTOR MEMORY

George S. Leach, and Timothy R. O'Connell, both of Phoenix, Ariz., assignors to Electronic Memories & Magnetics Corporation, Encino, Calif.

Filed Jun. 23, 1978, Ser. No. 918,394
Int. Cl.[2] H03K *17/12, 17/04, 17/60, 3/353*
U.S. Cl. 307—270 **5 Claims**



1. A drive circuit operable in response to applied first and second signals to supply to an output terminal a signal of predetermined potential substantially equal to a supply potential, said drive circuit comprising:

a first charging circuit including a first capacitor and a first switchable depletion mode field effect device selectively switchable conductive for charging said first capacitor to the supply potential;

a second charging circuit including a second capacitor and a second switchable depletion mode field effect device selectively switchable conductive for charging said second capacitor to the supply potential;

an output circuit, including an output field effect device switch receiving the supply potential and drivable for coupling the supply potential to the output terminal; and

a control circuit coupled to said first and second charging circuits, said control circuit being responsive to the first signal for switching conductive said first and second switchable depletion mode devices to charge said first and second capacitors to the supply potential,

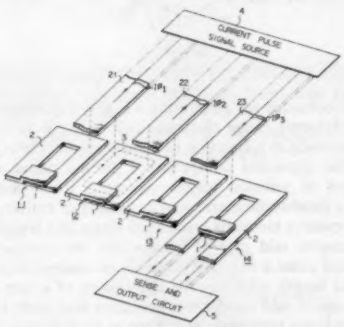
said control circuit being operable in response to the second signal for switching said first and second depletion mode devices non-conductive and for raising the base reference potential of said second capacitor towards the supply potential,

said control circuit being further responsive to the second signal for serially interconnecting and cascading said first and second capacitors to apply the combination of their individual potentials and the raised base reference potential to said output circuit for overdriving said output switch with a predetermined portion of the combined potentials to couple substantially the full supply potential to the output terminal.

4,176,290
SUPERCONDUCTIVE JOSEPHSON CIRCUIT DEVICE

Akira Ishida, Tokyo, and Hajime Yamada, Tokorozawa, both of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Oct. 19, 1977, Ser. No. 843,596
Claims priority, application Japan, Oct. 27, 1976, 51-128232; Dec. 25, 1976, 51-157194
Int. Cl.[2] H03K *3/38, 19/195;* **G11C** *19/32*
U.S. Cl. 307—306 **8 Claims**



1. A superconductive Josephson circuit device for use in a shift register, comprising:

at least three superconductive closed loops, each of said superconductive closed loops including at least one Josephson junction capable of carrying Josephson current I_J and having a Josephson junction free portion including inductance L, wherein the inductance-Josephson current product, LI_J, is selected around magnetic flux quantization unit, $\Phi_o = 2.07 \times 10^{-15}$ Webers, whereby trapping and releasing of a magnetic flux quantum are made therein, each closed loop having no resistive component of impedance;

coupling means for providing a predetermined amount of loop-to-loop coupling so that said superconductive closed loops are magnetically coupled with each other in series fashion such that said Josephson junction-free portion of each superconductive closed loop is located close to the Josephson junction free portion of at least two adjacent superconductive closed loops; and

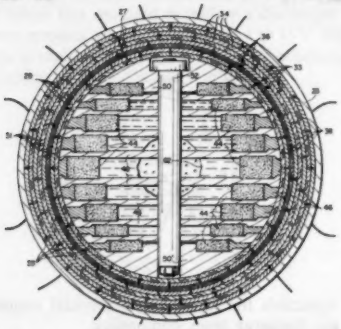
shift operation control means for providing a magnetic flux into each of said superconductive closed loops and for causing a magnetic flux quantum to be trapped into the loops or to be released from the loops, whereby a magnetic flux quantum representing a logic "1" data information is sequentially shifted from loop to loop in shift register fashion.

4,176,291

STORED FIELD SUPERCONDUCTING ELECTRICAL MACHINE AND METHOD

Mario Rabinowitz, Menlo Park, Calif., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed May 27, 1977, Ser. No. 801,241
Int. Cl.[2] H02K *9/00*
U.S. Cl. 310—52 **35 Claims**



1. Apparatus for providing a magnetic field in a superconducting, rotating electrical machine, said machine having an axis of rotation, comprising:

(a) a housing for supporting the electrical machine;

(b) an elongate flux trapping cylindrical means fabricated of superconductive material and mounted in the housing for trapping a magnetic field therein, said superconductive material in the cylindrical means having an annular cross section normal to the axis of rotation of the machine and a unitary length along the axis of rotation substantially equal to the length of the machine, said trapped magnetic field forming a magnetic circuit with an armature winding mounted in the housing;

(c) means within the housing and attached thereto for generating a magnetic pattern field in the cylindrical means; and

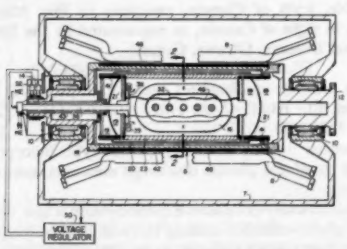
(d) means within the housing and attached thereto for cooling the cylindrical means so that a magnetic field can be trapped in the cylindrical means from the pattern field, said trapped magnetic field thereby providing a magnetic field in the machine.

4,176,292

AUXILIARY FIELD WINDING FOR A SUPERCONDUCTIVE ALTERNATING CURRENT ELECTRICAL MACHINE AND METHOD OF EXCITING SAME

Swarn S. Kalsi, Clifton Park, and Madabushi V. K. Chari, Schenectady, both of N.Y., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Sep. 2, 1977, Ser. No. 830,155
Int. Cl.[2] H02K *9/00*
U.S. Cl. 310—52 **14 Claims**



1. Apparatus in a superconductive alternating current electrical machine having both a stator and a rotor, said rotor rotates inside of and with respect to the stator which is stationary, comprising:

(a) a superconductive main field winding housed in the rotor in the machine for providing a substantially steady-state magnetic field to an armature winding attached to the stator in the machine;

(b) an auxiliary field winding in the rotor in the machine for providing a transient magnetic field to the armature winding in cooperation with the main field winding, said auxiliary field winding having a substantially shorter time constant than the main field winding;

(c) means in the rotor for supporting the main field and auxiliary field windings in the machine; and

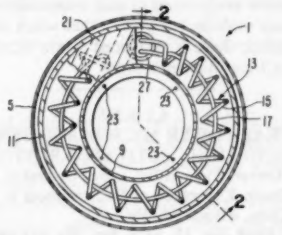
(d) voltage regulating means, electrically connected to the main field and auxiliary field windings through low voltage and main exciter means for varying the excitation in the main field and auxiliary field windings, during steady-state load conditions said voltage regulating means exciting only the main field winding, during transient load conditions said voltage regulating means exciting the auxiliary field winding to make up the difference between the magnetic field required by the armature winding to meet the instantaneous load placed on the machine and the magnetic field supplied by the main field winding so that during both steady-state and transient operations the voltage regulation necessitated by the load is provided.

4,176,293

THERMIONIC CATHODE HEATER HAVING REDUCED MAGNETIC FIELD

Robert H. Giebeler, Sunnyvale, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 17, 1978, Ser. No. 879,017
Int. Cl.[2] H01J *1/15, 19/08;* **H01K** *1/02*
U.S. Cl. 313—343 **11 Claims**



1. In a thermionic electron emitter, an electrical resistance heater comprising at least nearly one turn of a first curved hollow helical conductor, and a second conductor extending through said first conductor in spaced electrically insulative relationship therewith, said first and second conductors being electrically interconnected at one common end thereof, the other ends of said conductors being electrically discrete, whereby a source of electric power connected between said discrete ends will cause current to flow serially through said first and second conductors, the direction of current in the two conductors being in the opposite sense and stray magnetic field due to the movement of said current are minimized.

4,176,294

METHOD AND DEVICE FOR EFFICIENTLY GENERATING WHITE LIGHT WITH GOOD RENDITION OF ILLUMINATED OBJECTS

William A. Thornton, Jr., Cranford, N.J., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 619,544, Oct. 3, 1975, abandoned, which is a continuation of Ser. No. 96,744, Dec. 10, 1970, abandoned, which is a continuation-in-part of Ser. No. 742,291, Jul. 3, 1968, abandoned. This application Dec. 3, 1976, Ser. No. 747,141
Int. Cl.[2] H01J *61/62, 63/04, 61/00*
U.S. Cl. 313—485 **31 Claims**

1. A device which efficiently generates white light and

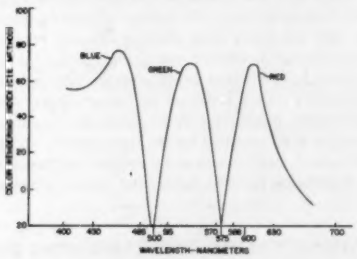
illuminates objects with a color appearance which is reasonably representative of their color appearance under natural light, said device comprising:

(a) a three-component, light-generating medium forming an operative part of said device;

(b) means for connecting said device to a source of predetermined electric potential to energize said medium to a visible-light-generating condition;

(c) a first component of said medium when energized exhibiting a green to yellow-green emission located substantially in the wavelength range of from 515 nm to 570 nm;

(d) a second component of said medium when energized exhibiting an orange to red emission located substantially in the wavelength range of from 588 nm to 630 nm;



(e) the third component of said medium when energized enhibiting a purplish-blue to greenish-blue emission located substantially in the wavelength range of from 430 nm to 485 nm; and

(f) the relative proportions of said components of said light-producing medium being such that when their emissions are blended, there is produced white light of predetermined ICI coordinates.

4,176,295

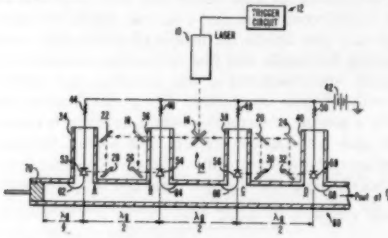
HIGH PEAK POWER MICROWAVE GENERATOR USING LIGHT ACTIVATED SWITCHES

Michael C. Driver, Penn Hills; James G. Oakes, Franklin, and John R. Davis, Export, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 15, 1978, Ser. No. 915,649

Int. Cl.[2] H03K *3/42, 3/57*

U.S. Cl. 315—39 **12 Claims**



1. A microwave generator comprising:

(a) wave guide means;

(b) at least two resonant transmission lines connected at intervals along the length of said wave guide means;

(c) light sensitive switch means electrically connected respectively to each of said transmissions lines;

(d) direct current energizing means connected to said transmission lines; and

(e) means for periodically sending a laser beam to said light sensitive switch means, whereby the actuation of said switch means causes the electromagnetic energy in the transmission lines to be coupled into the wave guide means from whence it is propagated as a pulse train.

4,176,296

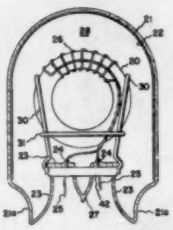
CORE MOUNTING FOR SOLENOIDAL ELECTRIC FIELD LAMPS

John M. Anderson, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 22, 1978, Ser. No. 917,940

Int. Cl.[2] H05B *41/24;* **H01F** *15/02, 27/02*

U.S. Cl. 315—71 **17 Claims**



1. An apparatus for supporting a toroidal magnetic core within a gas discharge lamp, comprising:

a first wire loop passing over both sides of said core in chord-like fashion, said first loop adapted for attachment to anchor points distally spaced from said core;

a second wire loop passing over both sides of said core in chord-like fashion, said second loop having substantially the same dimensions as said first loop, said second loop also adapted for attachment to anchor points distally spaced from said core, said second loop being positioned on said core in mirror image fashion with respect to said first loop; and

a third wire loop encircling said core and said first and second loops in chord-like fashion, said third loop chord intersecting those chord ends of said first and second loops which are nearest the portion of said loops adapted for attachment.

9. A solenoidal electric field discharge lamp comprising:

a translucent envelope internally coated with a phosphor material which emits electromagnetic radiation at visible wavelengths upon stimulation by electromagnetic radiation, said envelope including a header;

an ionizable fill gas disposed within said envelope;

a radio frequency electric energy source;

a toroidal magnetic core disposed within said envelope and supported on the header thereof by the apparatus of claim 1; and

an insulated winding with a plurality of turns looping through said core and coupled to said energy source.

4,176,297

ULTRA VIOLET INITIATED GAS DISCHARGE VISUAL DISPLAY MATRIX

William G. Thistle, Manotick, and Joseph G. G. Dionne, Loretteville, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed Sep. 19, 1977, Ser. No. 834,567

Claims priority, application Canada, Oct. 26, 1976, 264198

Int. Cl.[2] H05B *41/00;* **H01J** *61/02;* **G11C** *11/28*

U.S. Cl. 315—150 **13 Claims**

1. A visual display assembly of the type incorporating a matrix of small gas plasma discharge elements, said assembly comprising:

(i) an electrically conductive cathode with a low work function photo-emissive coating thereon, said coating emitting electrons when irradiated with ultra-violet light;

(ii) an insulating plate, in gas sealing arrangement with said coating, said plate having a plurality of cavities formed therein;

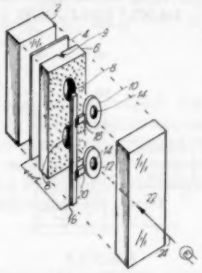
(iii) a plurality of anodes on said insulating plate each having

an aperture therein axially aligned with an associated cavity;

(iv) a plurality of electrical resistive means on said insulating plate connected one each to said anode for limiting discharge current in said cavities and anodes;

(v) electrical supply means to apply a dc potential to said anodes through the resistive means associated therewith at a level below that required to initiate a discharge;

(vi) a cover member which is transparent to U.V. light and which is in sealing engagement with said insulating plate and enclosing said anodes and said cavities;



(vii) a mixture of noble gases capable of luminous discharge in each of said cavities;

(viii) U.V. illuminating means aligned with selected cavities for directing U.V. light through said cover plate into said selected cavities thereby to strike the said cathode and initiate discharge within said cavities, said dc potential being sufficient to sustain said discharge; and,

(ix) switch means to disconnect said dc potential from selected anodes.

4,176,298

DISPLAY PANEL APPARATUS AND METHOD OF DRIVING

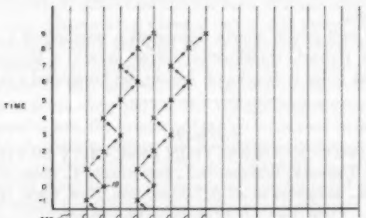
Richard K. Kirchner, Bloomington; William N. Mayer, and Nicholas C. Andreadakis, both of White Bear Lake, all of Minn., assignors to Modern Controls, Inc., Minneapolis, Minn.

Filed May 23, 1977, Ser. No. 799,342

The portion of the term of this patent subsequent to Mar. 21, 1995, has been disclaimed.

Int. Cl.[2] H05B *37/00, 39/00, 41/00*

U.S. Cl. 315—169.2 **14 Claims**



1. A method of voltage-exciting a gas display panel of the type having a plurality of parallel gas channels and a further plurality of orthogonal parallel conductors separated from said channels by a dielectric medium, wherein said conductors are sequentially grouped in triplets for purposes of defining gas cell regions in said gas channels and the shifting forward along said channels of an ignited or unignited gas cell region is accomplished by predictable control of electric surface charges along said dielectric medium, comprising the steps of:

(a) shifting said electric surface charges backward one adjacent conductor position along said channel;

(b) shifting said electric surface charges forward two adjacent conductor positions along said channel; and

(c) repeating steps a) and b) two additional times.

4,176,299

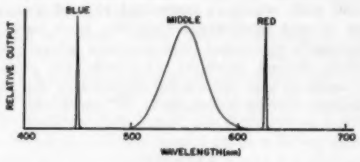
METHOD FOR EFFICIENTLY GENERATING WHITE LIGHT WITH GOOD COLOR RENDITION OF ILLUMINATED OBJECTS

William A. Thornton, Jr., Cranford, N.J., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 747,141, Dec. 3, 1976, which is a continuation of Ser. No. 619,544, Oct. 3, 1975, abandoned, which is a continuation of Ser. No. 96,744, Dec. 10, 1970, abandoned, which is a continuation-in-part of Ser. No. 742,291, Jul. 3, 1968, abandoned. This application Jan. 11, 1978, Ser. No. 868,578

Int. Cl.[2] H01J *61/48*

U.S. Cl. 315—326 **11 Claims**



1. The method of efficiently producing white light which illuminates objects with a color appearance which is reasonably representative of their color appearance under natural light, which method comprises:

(a) blending together a first light component which is green to yellow-green in color with a second light component which is orange to red in color and a third light component which is purplish-blue to greenish-blue in color, said first light component is principally confined within a wavelength range of from 515 nm to 570 nm, said second light component is principally confined within a wavelength range of from 588 nm to 630 nm, and said third light component is principally confined within a wavelength range of from 430 nm to 485 nm, said blended light having at most only a limited amount of radiations of a wavelength shorter than 430 nm and at most only a limited amount of radiations of a wavelength longer than 630 nm as well as at most only a limited amount of radiations of a wavelength of about 575 nm and at most only a limited amount of radiations of a wavelength of about 500 nm; and

(b) controlling the relative light intensities of said first, second and third light components to produce white light of predetermined ICI coordinates.

4,176,300

DEFLECTION WAVEFORM GENERATOR

Glenn C. Waehner, Riverside, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 779,643, Mar. 21, 1977, abandoned. This application Jul. 21, 1978, Ser. No. 926,691

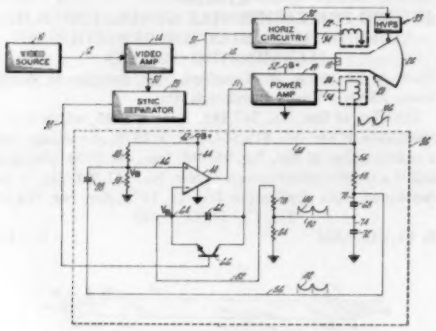
Int. Cl.[2] H01J *29/70*

U.S. Cl. 315—371 **4 Claims**

1. A waveform generator to be used in conjunction with a CRT having a deflection yoke, comprising:

an operational amplifier means having an inverting and a non-inverting inputs in which the input time constants are substantially equal, and an output from which a signal waveform suitable for driving a CRT deflection yoke can be derived, and further including integrating means coupled to said inverting input for creating a basic sawtooth;

means coupled to said deflection yoke of said CRT for integrating the current waveform driving said deflection yoke; and



feedback means having a first path which is connected to said inverting input of said operational amplifier and a second path which is connected to said non-inverting input of said operational amplifier, both paths having substantially equivalent time constants whereby a pair of similarly shaped parabolic waveforms are presented to said inputs of said operational amplifier so that said yoke deflection current waveform is "S" corrected.

4,176,301

CIRCUIT ARRANGEMENT FOR SUPPLYING A PROTECTION SIGNAL FOR A TELEVISION PICTURE DISPLAY TUBE

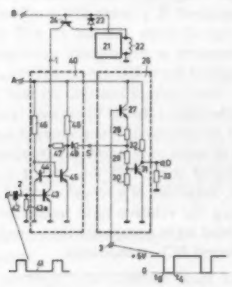
Paul Sonnenberger, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 17, 1978, Ser. No. 887,675

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1977, 2711636

Int. Cl.[2] H01J *29/52*

U.S. Cl. 315—384 **12 Claims**



1. A circuit arrangement for supplying a protection signal to a display tube in the event of a disturbed deflection during which a periodic pulse shaped first signal having the deflection frequency is not produced, said circuit comprising a capacitor coupled to receive a periodic second signal of the same frequency and independent relative to said first signal, said second signal initiating charging said capacitor to provide for the generation of said protection signal, a switch means coupled to said capacitor having a control input means for receiving said first signal and for discharging said capacitor upon receiving said first signal, and a threshold means coupled to said capacitor for providing said protection signal when the capacitor voltage exceeds a threshold voltage.

4,176,302

VERTICAL DEFLECTION OUTPUT CIRCUIT

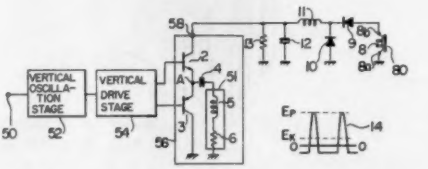
Fumio Inoue, Yokohama, and Michio Masuda, Tokyo, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 15, 1977, Ser. No. 787,843

Claims priority, application Japan, Apr. 19, 1976, 51-43552; Apr. 19, 1976, 51-43557; Apr. 19, 1976, 51-43558; Apr. 19, 1976, 51-43559; Apr. 19, 1976, 51-43560; Apr. 19, 1976, 51-43561

Int. Cl.[2] H01J *29/70*

U.S. Cl. 315—397 **10 Claims**



1. A vertical deflection output circuit comprising:

a vertical deflection yoke;

a single-ended push-pull circuit for supplying a vertical deflection current to said vertical deflection yoke; and

power supply means for supplying to said single-ended push-pull circuit a first operating voltage for feeding to said vertical deflection yoke a predetermined vertical deflection current during a vertical scan period, and a second operating voltage, which is higher than said first operating voltage, for restoring the vertical deflection current during a vertical retrace period from its magnitude corresponding to the end of the vertical scan period to its magnitude corresponding to the start of the vertical scan period, said power supply means comprising:

a power source for generating a periodic voltage waveform whose peak value is equal to or higher than said second operating voltage and whose mean value in the same polarity as said peak value is equal to or lower than said first operating voltage; and

choke-input means coupled between said power source and said single-ended push-pull circuit for producing a d.c. voltage whose level decreases from said peak value to said mean value in accordance with an increase of a d.c. load current thereof from zero to a predetermined current level which is less than the maximum vertical deflection current; and

wherein said power source comprises a winding of a horizontal flyback transformer across which a horizontal flyback pulse is developed during the horizontal cycle.

4,176,303

TELEVISION S-CORRECTION LINEARITY DEVICE

William E. Babcock, Warren, N.J., and Ronald L. Hess, Zionsville, Ind., assignors to RCA Corporation, New York, N.Y.

Filed May 17, 1978, Ser. No. 906,836

Int. Cl.[2] H01J *29/70, 29/76*

U.S. Cl. 315—400 **7 Claims**

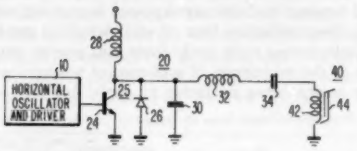
1. An arrangement for deflecting the electron beam for a wide-angle kinescope, comprising:

a deflection winding disposed about the kinescope;

deflection current generator means coupled to said deflection winding for promoting the flow of a recurrent deflection current at a deflection rate in said deflection winding for causing the kinescope beam to scan a raster on the face of the kinescope, said raster having a bilateral-geometric

distortion having the appearance of progressive expansion towards the raster sides and progressive compression towards the raster center;

S-correction capacitance means serially coupled with said deflection winding for symmetrically correcting said compression towards said raster center, said S-correction means causing excessive correction of said progressive expansion towards said raster sides;



variable impedance means coupled with said deflection winding and varied for linearity correction;

wherein the improvement resides in that said variable impedance means varies in a bilateral manner at said deflection rate to increase the time rate of change of said deflection current towards said raster sides.

4,176,304

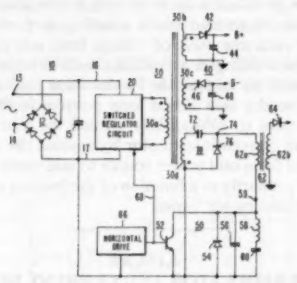
REGULATING TELEVISION HORIZONTAL DEFLECTION ARRANGEMENT

Howard M. Scott, Moorestown, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 9, 1978, Ser. No. 904,451

Int. Cl.² H01J *29/00*

U.S. Cl. 315—411 **6 Claims**



1. An improved energizing circuit for a television horizontal deflection circuit comprising:

a source of alternating voltage, the voltage cycling at the horizontal deflection rate between first and second magnitudes relative to an average value, said second magnitude being variable and said first magnitude being maintained constant by variation of the relative duration during the cycle of first and second intervals, respectively, during which said first and second voltage magnitudes recur;

a transformer, the primary of which is coupled to said source of alternating voltage and including a secondary winding;

a storage capacitor serially coupled with a rectifier, the serial combination being coupled across said secondary winding for charging said capacitor during said recurrent first intervals;

a horizontal deflection stage including a horizontal switching transistor having a main current conduction path and a horizontal deflection winding coupled across said main current conduction path; and

inductance means coupling said current conduction path across said rectifier means for applying the sum of said capacitor and transformer secondary voltage to said inductance means during said second intervals for causing a constant energy to be stored in said inductance means for operating said horizontal output stage during each deflection cycle.

4,176,305

GALVANO MAGNETIC POSITION CONTROL SYSTEM

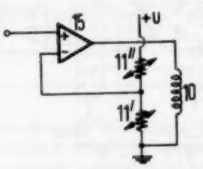
Hans-Hellmuth Cuno, Waldetzenberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Nov. 30, 1977, Ser. No. 855,899

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1976, 2658528

Int. Cl.² G05B *1/06*

U.S. Cl. 318—653 **3 Claims**



1. A position control system for control of electrodynamic drives having an air gap penetrated by a magnetic field and a drive coil located for movement in that air gap in a first direction essentially perpendicular to the magnetic field and in a direction opposite that first direction, the drive coil having a first and a second terminal, comprising:

a first and a second resistor each mechanically affixed in spaced relation to the drive coil such that as the drive coil moves in the first direction and opposite to the first direction each said resistor moves substantially perpendicular to the magnetic field in said first direction or in said opposite direction, and said spaced relation being such that as the coil and said resistors move in said first direction, said first reactor moves out of the magnetic field simultaneously as said second resistor moves into the magnetic field and such that as the coil and said resistors move opposite said first direction said first resistor moves into the magnetic field simultaneously as said second resistor moves out of the magnetic field;

each said resistor having a first and a second terminal with the resistive characteristic measurable between said first and second terminals of each said resistor being a known function of the position of each said resistor with respect to the magnetic field in the air gap;

means for electrical control including an operational amplifier having a first and a second input terminal and an output terminal with said first terminal being a signal input terminal and with said second terminal being a feedback terminal;

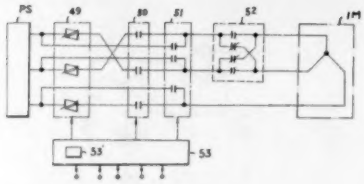
said output terminal of said operational amplifier being connected to the first terminal of the drive coil, said first terminal of said first resistor being connected to a voltage input terminal, said second terminal of said first resistor being connected to said first terminal of said second resistor, said second terminal of said second resistor being operatively connected to the second terminal of the drive coil and to a ground point of said means for electrical contrl with said second terminal of said operational amplifier being operatively connected to said junction of said second terminal of said first resistor and said first terminal of said second resistor;

whereby said electrical control means is operable so that any difference between the signals applied to said first and said second terminals of said operational amplifier is amplified and applied to the drive coil causing it to move so as to minimize the aforesaid difference between the signals. control

4,176,306
SPEED CONTROL APPARATUS

Tetsumasa Asano; Osamu Yatsuki; Kazuyuki Fujimoto, and Harutoshi Hashimoto, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 643,926, Dec. 23, 1975, abandoned.
This application Apr. 27, 1978, Ser. No. 900,664
Claims priority, application Japan, Dec. 27, 1974, 49-2613; Jan. 24, 1975, 50-10792; Feb. 20, 1975, 50-21598; Feb. 21, 1975, 50-22031; Mar. 7, 1975, 50-28196
Int. Cl.[2] H02P *5/40*
U.S. Cl. 318—772 **3 Claims**



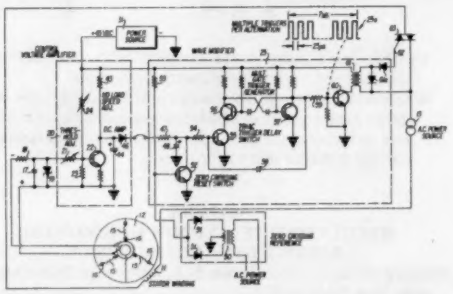
1. A speed control apparatus comprising:
(1) switch means for use during high speed operation disposed between a three phase AC power source and a motor;
(2) switch means for use during low speed operation disposed between the AC power source and the motor and including at least one semiconductor switch for each phase and a plurality of phase connection contactors;
(3) low speed control means for controlling turn-on and off of the semiconductor switch by generating a $1/(6n\pm1)$ frequency dividing turn-on pulse wherein n is an integer, the control means including
(a) a plurality of synchronizing signal generators connected to the phases of the power source;
(b) a ring counter operated by one of the synchronizing signals;
(c) frequency control means for logically processing the synchronizing signals and the output of the ring counter to generate a low frequency output; and
(d) turn-on control means responsive to the low frequency output for generating the turn-on signal of the semiconductor switch;
(4) speed reduction switch means for switching the motor from high speed to low speed; and
(5) switch control means for shifting the phase connection order in the high speed and the phase connection order in the low speed.

4,176,307
ENERGY ECONOMIZING AC POWER CONTROL SYSTEM

Louis W. Parker, 2040 N. Dixie Hwy., Ft. Lauderdale, Fla. 13305

Filed May 17, 1978, Ser. No. 906,702
Int. Cl.[2] H02P *7/36*
U.S. Cl. 318—798 **8 Claims**

1. An energy economizing AC power control system operative to reduce the iron and copper losses in an induction motor, comprising an AC induction motor having a stator winding and a rotor adapted to be coupled to a load, a sine wave power source for energizing said stator winding to effect rotation of said rotor, said rotor comprising a plurality of shorted windings and also comprising unshorted additional winding means carried by said rotor, said additional winding means being operative to generate an AC voltage during rotation of said rotor having a frequency which is the same as the frequency in said shorted windings and an amplitude which is proportional to the load on said motor, and closed loop positive feedback control means operative to control the energization of said stator winding from said power source during a limited range of motor speeds near the full speed of said motor, said closed loop positive feedback means comprising rectifier means coupled to said additional winding means on said rotor for rectifying said AC signal to produce a substantially DC signal, control means responsive to said DC signal from said rectifier means for producing a control voltage which is a function of the speed of said motor, wave modifier means coupled to the output of said control means and responsive to said control voltage, said wave modifier means including switching means disposed between said sine wave power source and said stator winding, the conduction time of said switching means being controllable during each cycle from said power source as a function of the magnitude of said control voltage, said wave modifier means being operative to apply full sine waves of

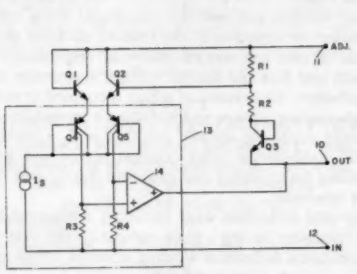


voltage from said power source to said stator winding during rotational start-up and speed build-up of said motor and, as said motor approaches full speed, then being operative to vary the electrical angle of each cycle of said power source which is actually coupled to said stator winding to provide varying fractions of each sine wave of voltage from said power source to said stator winding in accordance with the energy requirements imposed on said motor by the rotor load at any given moment, whereby said closed loop positive feedback control means functions to substantially reduce the iron and copper losses of said conventional motor by causing the average current supplied from said power source to said stator windings to be supplied primarily as a function of the load on said motor as the load on said motor varies.

4,176,308
VOLTAGE REGULATOR AND CURRENT REGULATOR

Robert C. Dobkin, Hillsborough, and Robert A. Pease, San Francisco, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Sep. 21, 1977, Ser. No. 835,243
Int. Cl.[2] G05F *1/58, 1/60*
U.S. Cl. 323—4 **20 Claims**



1. A voltage regulator comprising:
an output terminal for providing an output voltage;
an adjustment terminal; and
a control circuit connected to the output terminal and the adjustment terminal for maintaining the voltage at the out-

put terminal at a level that differs from the voltage at the adjustment terminal by a predetermined voltage difference; characterized by the control circuit comprising:

a resistive divider coupled between the output terminal and the adjustment terminal;

a pair of transistors having their collectors connected in common and their bases respectively coupled to the resistive divider to provide a portion of said voltage difference between the output terminal and the adjustment terminal across said bases, wherein the two transistors are adapted for operating at different circuit densities for providing a predetermined ratio in current flow through the pair of transistors when the voltage difference between the output terminal and the adjustment terminal is said predetermined voltage difference; and

a high-gain amplifier circuit connected to the emitters of the pair of transistors and to the output terminal for driving the output terminal to a maintained voltage level at which said current flow through the pair of transistors is at said predetermined current ratio and the voltage difference between the output terminal and the adjustment terminal is said predetermined voltage difference.

4,176,309

STABILIZED VOLTAGE REGULATOR CIRCUIT, PARTICULARLY FOR USE WITH A SERIALLY CONNECTED PNP TRANSISTOR

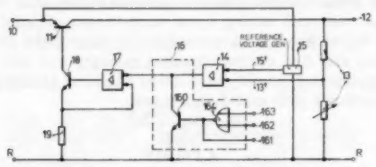
Alfred Schulz, Oberriexingen; Uwe Kiencke, Ludwigsburg, and Günther Hönig, Markgröningen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 27, 1978, Ser. No. 890,416

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1977, 2716500

Int. Cl.[2] G05F *1/56*

U.S. Cl. 323—4 **11 Claims**



1. Direct current voltage regulator circuit adapted for connection to unregulated input terminals (10,R) and provide a regulated output voltage at output terminals (12,R) having

a control transistor (11), serially connected between an input terminal (10) and an output terminal (12);

reference voltage generating means (15) generating a reference voltage;

a first control loop (13, 14, 15) comprising

a comparator-control amplifier (14) having said reference voltage applied thereto and additionally connected to a voltage representative of the actual output voltage and generating a control error signal to control the conduction of said control transistor (11),

and a second control loop (17, 18, 19) comprising

means (19) deriving a signal representative of actual base current flow in the control transistor (11);

a second comparator (17) having said control error signal applied thereto and additionally connected to the signal representative of actual base current of the control transistor, and connected to and controlling the flow of base current of the control transistor (11).

4,176,310

DEVICE COMPRISING A TRANSFORMER FOR STEP-WISE VARYING VOLTAGES

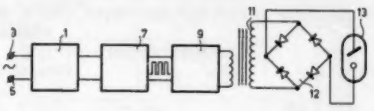
Cornelis W. Elenga; Pieter van Dijk, and Alfred J. van der Zwart, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 13, 1978, Ser. No. 885,635

Claims priority, application Netherlands, Mar. 30, 1977, 7703425

Int. Cl.[2] G05F *3/00*

U.S. Cl. 323—7 **10 Claims**



1. A device for suppressing oscillations in a transformer comprising, a pair of input terminals for connection to a source of stepwise varying voltage, a transformer having a primary winding for coupling to said input terminals and a secondary winding for coupling to a load, said transformer exhibiting a leakage inductance and a parasitic capacitance of a value to produce oscillations in the secondary winding in response to a stepwise voltage applied to the primary winding, a circuit having first and second connection terminals, means connecting said circuit in series with said primary winding across the input terminals, said circuit including inductance means and rectifier means connected together so that the current through the inductance means does not reverse its direction of flow when the polarity of the voltage across the first and second connection terminals of said circuit is reversed, the inductance of said inductance means being at least 10 times larger than the leakage inductance of the transformer.

4,176,311

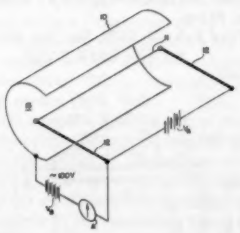
POSITIVE ION SMOKE DETECTOR USING A TUNGSTEN WIRE PREHEATED IN HYDROGEN TO INCREASE SENSITIVITY

William D. Davis, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 23, 1976, Ser. No. 753,774

Int. Cl.[2] G01N *27/62*

U.S. Cl. 324—468 **8 Claims**



1. A method for detecting smoke in an ambient atmosphere comprising:

disposing a heated wire opposite a collector electrode, said heated wire comprising tungsten which has been fired in hydrogen gas;

applying a negative electric potential on said electrode with respect to said wire;

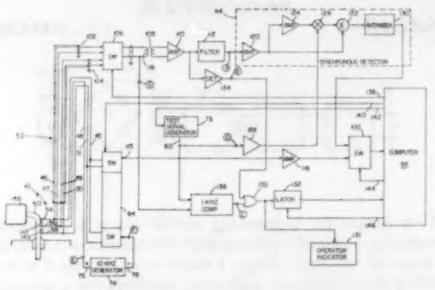
introducing a sample of a test gas between said wire and said electrode; and

determining the presence of smoke particles in said test gas by an increase in electrical current flow between said wire and said electrode.

4,176,312
ELECTRICAL CIRCUITRY FOR MEASURING LOW LEVEL SIGNALS

Joseph F. Wrinn, North Quincy, Mass., assignor to Teradyne, Inc., Boston, Mass.

Filed Feb. 24, 1978, Ser. No. 880,789
Int. Cl.[2] G01R 27/00
U.S. Cl. 324—57 N 6 Claims



1. In electrical circuitry for measuring low level signals comprising a source of ac signals to be measured, a synchronous detector clocked at the frequency of said ac, and a transformer coupling said source to said detector, that improvement comprising, between said transformer and said detector,

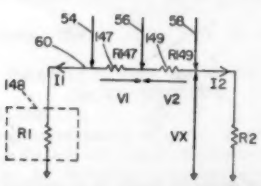
a wideband amplifier for amplifying both the information signal and noise present in the transformer output, followed by

a filter having a passband of width intermediate those of said amplifier and said detector and centered on the clock frequency of the detector.

4,176,313
ANALYZING ELECTRICAL CIRCUIT BOARDS

Joseph F. Wrinn, North Quincy, Mass., assignor to Teradyne, Inc., Boston, Mass.

Filed Feb. 24, 1978, Ser. No. 880,792
Int. Cl.[2] G01R 27/02
U.S. Cl. 324—62 30 Claims



1. Apparatus for locating a faulty IC on the node of a circuit board having a plurality of ICs thereon, comprising

first means for measuring the internal resistance R_1 of a selected IC on the node,

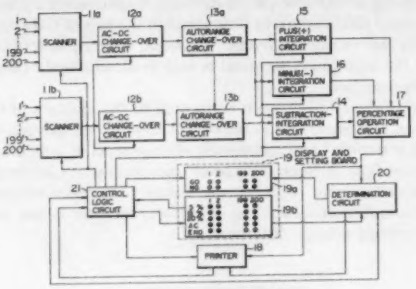
second means for measuring the parallel resistance R_2 of the other ICs on the node, and

third means for comparing at least one of R_1 and R_2 with a predetermined value K, where K is no smaller than the expected value of the internal resistance R_d of an active driving IC on said node.

4,176,314
DOUBLE INTEGRATION METHOD FOR MEASURING DEVIATION OF STANDARD AND REFERENCE ANALOG QUANTITIES

Toyohiko Yamada, Nagoya, Japan, assignor to Shin-Shirasuna Electric Corp., Aichi, Japan

Filed Oct. 31, 1977, Ser. No. 847,235
Claims priority, application Japan, Nov. 15, 1976, 51-137008
Int. Cl.[2] G01R 17/00, 15/12, 31/02
U.S. Cl. 324—140 D 1 Claim



1. A method of measuring electrical analog quantities comprising subtracting a first analog signal representing a first electrical analog quantity which is to be a reference from a second analog signal representing a second electrical analog quantity which is to be compared with said first analog quantity, to thereby obtain a difference signal, integrating said difference signal for a pre-determined time to thereby obtain a third analog signal and simultaneously therewith integrating said first analog signal for said pre-determined time to obtain a fourth and a fifth analog signal representing the positive and the negative value of said integration, obtaining the sum of the integral of said third analog signal and said fifth or said fourth analog signal in accordance with the positive or the negative sign of said third analog signal to thereby obtain a sixth analog signal, detecting the time from the point whereat said integration for obtaining said sixth analog signal is started till the point whereat said sixth analog signal becomes zero to thereby obtain a digital signal, and measuring the ratio of the difference between said first electrical analog quantity and said second electrical analog quantity to said first electrical analog quantity in accordance with said digital signal.

4,176,315
MINIATURE ELECTRICAL VOLTAGE AND CONTINUITY TESTER WITH CIRCUIT COMPARTMENT AND TEST LEAD COMPARTMENT CASING

Earl D. Sunnarborg, Star Rte. 4, Box 1, Hibbing, Minn. 55746

Filed May 11, 1978, Ser. No. 904,784
Int. Cl.[2] G01R 1/04, 31/02
U.S. Cl. 324—156 14 Claims

1. A miniature electrical tester comprising:

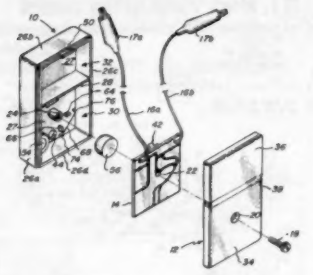
a molded plastic front case having a front wall and four side walls, a partition which separates the front case into a circuit compartment and a test lead compartment, a plurality of bosses on an inner surface of the front case for holding a plurality of batteries in position in the circuit compartment, and a plurality of holding pins on an inner surface of the front case for holding a battery interconnecting wire in position in the circuit compartment;

a circuit board for supporting and connecting electrical circuit components into testing circuitry, the components including an indicator light which is controlled by the testing circuitry, the indicator light being exposed through an indicator light aperture in the front wall of the front case when the circuit board is in position in the circuit compartment, the circuit board further including

battery contacts for making electrical connection between the batteries and the circuit board;

first and second test leads connected to the circuit board for connecting an input to the test circuitry when in use and and which may be stored in the test lead compartment when not in use;

a molded plastic back cover having a circuit cover section for covering the circuit compartment, a test lead cover section for covering the test lead compartment, and a flexible hinge section located between the circuit cover



and test lead cover sections and essentially covering the partition;

latch means for releasably holding the test lead cover section in closed position covering the test lead compartment;

screw means for holding the circuit cover section in position covering the circuit compartment; and

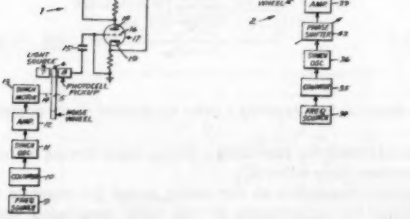
means between the circuit cover section and the circuit board for holding the circuit board in position with the battery contacts in contact with the batteries when the screw means holds the circuit cover section in position.

4,176,316

SECURE SINGLE SIDEBAND COMMUNICATION SYSTEM USING MODULATED NOISE SUBCARRIER

Louis A. DeRosa, Bloomfield, and Mortimer Rogoff, Nutley, both of N.J., assignors to International Telephone & Telegraph Corp., Nutley, N.J.

Filed Mar. 30, 1953, Ser. No. 345,296
Int. Cl.[2] H04K *1/02*
U.S. Cl. 325—32 **13 Claims**



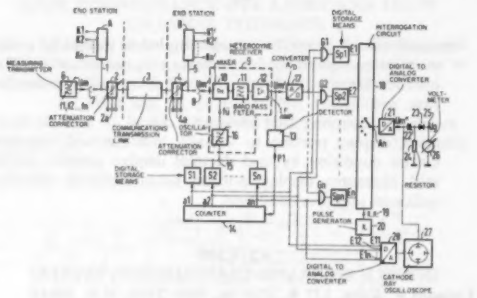
10. A transmitter for a secret communication system comprising a source of carrier frequency energy, a source of cyclically repetitive noise energy, means to synchronize the cyclical repetition rate of said noise energy with a sub-multiple of the frequency of said carrier frequency energy, means to reverse the phase of portions of said noise energy in accordance with a predetermined message code, means to modulate said carrier frequency energy with said encoded noise energy and means to transmit the suppressed carrier single sideband component of said carrier modulation.

4,176,317

CIRCUIT ARRANGEMENT FOR DETERMINING THE FREQUENCY DEPENDENT AMPLITUDE FLUCTUATION CHARACTERISTIC OF A COMMUNICATIONS TRANSMISSION LINK

Alfred Manfreda, Germering, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Feb. 22, 1977, Ser. No. 770,266
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1976, 2613054
Int. Cl.[2] H04B *1/62*
U.S. Cl. 325—62 **3 Claims**



1. A circuit arrangement for determining the frequency dependent amplitude fluctuation characteristic of a communications transmission link, including a measuring transmitter which produces a measuring signal of constant amplitude and at a frequency which is variable within the transmission frequency band, and a measuring device which receives said measuring signal, after it has passed through the communications transmission link, and said measuring device measures the frequency-dependent amplitude fluctuations of said measuring signal, and wherein said measuring transmitter **(6)** delivers a series of n individual frequencies **(f1, f2 . . . fn)** which lie in the frequency gaps between the individual communications transmission channels **(K1 . . . Kn)** of said communications transmission link, an analog to digital converter **(17)** receiving the output of said communications transmission link, a plurality of n digital storage means **(Sp1, Sp2 . . . Spn)** each of them being individually assigned to the n frequencies (fl, **f2 . . .** fn) and into which the received measuring signals (Um') are individually supplied from the output of said analog to digital converter **(17)**, an interrogation circuit **(18)** to consecutively interrogate said digital storage means **(Sp1, Sp2 . . . Spn)**, a digital to analog converter **(21)** connected to the output of said interrogation circuit, , a capacitor **(22)** which cuts off the DC mean value connected to the output of said analog to digital converter, a rectifier circuit **(23, 24)** connected to said capacitor to produce a voltage (Ug) which indicates the frequency-dependent amplitude fluctuation of the measuring signal (Um'), and a voltmeter **(26)** connected to the output of said rectifier circuit **(23, 24)**.

4,176,318

RADIO TRANSMITTER DISPLAY INDICATOR

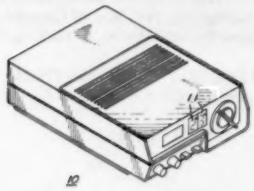
James A. Johnson, Buffalo Grove, and Paul E. Kerfoot, Streamwood, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 28, 1977, Ser. No. 782,274
Int. Cl.[2] H04B *1/02, 17/00*
U.S. Cl. 325—133 **12 Claims**

1. Apparatus for visually indicating an operational condition of a radio transmitter comprising:

radio communication equipment having a transmit circuit for emitting a transmit signal;

at least one character display module coupled to said radio communication equipment, said module having an integral character display portion for visually indicating one operative condition of said radio communication equipment and an integral decimal point display portion;



transmit circuit condition means coupled to said radio communication equipment for deriving a signal indicative of a transmit circuit condition different from said one condition; and

means for coupling said indicative signal to said decimal point display portion to visually indicate said transmit circuit condition by said decimal display portion while said character display portion simultaneously visually indicates said one condition.

4,176,319

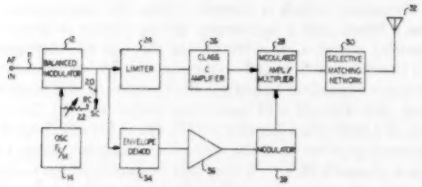
DOUBLE SIDEBAND TRANSMISSION SYSTEM

Leonard R. Kahn, 137 E. 36th St., New York, N.Y. 10016

Filed Dec. 4, 1975, Ser. No. 637,660

Int. Cl.[2] H04B *1/68*

U.S. Cl. 325—138 **18 Claims**



1. The method of producing a double-sideband wave at a desired frequency, comprising the following steps:

(a) generating a double-sideband wave at an odd sub-harmonic frequency of the desired frequency,

(b) demodulating the envelope modulation component of the double-sideband wave, and

(c) amplitude modulating the phase modulation component of the double-sideband wave by the demodulated envelope component in an amplitude modulated stage operating as an odd factor frequency multiplier.

4,176,320

TRANSMISSION TRUNK POWERING SYSTEM

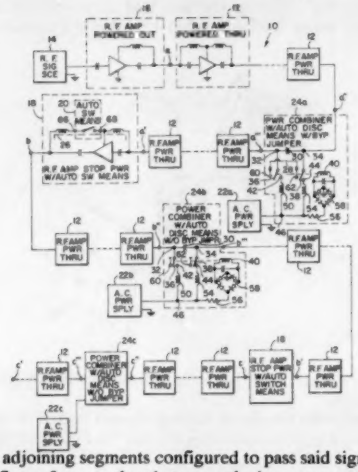
Victor Leshkowitz, 6 Airway Dr., Bellmore, N.Y.

Filed Sep. 28, 1978, Ser. No. 946,719

Int. Cl.[2] H04N *7/10*

U.S. Cl. 325—308 **9 Claims**

1. In a system for conveying a relatively high frequency signal along an elongated section of transmission line, said line comprising a plurality of sequential line segments, a different group of signal amplifiers associated with each line segment being disposed in series with said segment in spaced apart relationship along said segment for maintaining the level of signal to compensate for losses along said segment; a different source of relatively low frequency power associated with each line segment; a different power combiner means associated with each line segment coupling said power source associated with said segment to a point intermediate said line segment for impressing power on said segment; each of the amplifiers of said group being coupled to said segment in a manner for receiving power therefrom and allowing power to flow in parallel with said amplifier and first filter means in series between adjoining segments configured to pass said signal and to block flow of power therebetween; the improvement comprising: first automatic switch means associated with said first filter means for providing a power path between said adjoining line segments in response to the loss of power on either said adjoining segments.



4,176,321

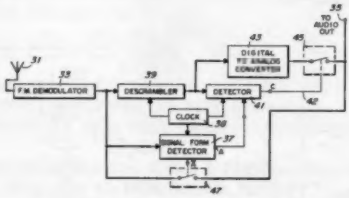
DELTA MODULATION DETECTOR

Paul H. Horn, Franklin Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 2, 1977, Ser. No. 830,256

Int. Cl.[2] H04B *1/10, 1/16;* **H04N** *7/16*

U.S. Cl. 325—325 **5 Claims**



1. A detector for detecting a delta modulated signal comprising;

a timing circuit for providing a timing signal having a predetermined time interval,

a counter responsive to the timing signal for counting the digital bit occurrences of the delta modulated signal within the predetermined time interval and providing a count signal giving the count of the digital bit occurrences of the delta modulated signal within the given time interval,

a decoder responsive to the timing signal and receiving the count signal from the counter and providing a binary signal of a first state when a count signal indicates number of bit occurrences of the delta modulated signal above a predetermined high level of count or below a predeter-

mined low level of low count and providing a binary signal of a second state when the count signal indicates the number of digital bit occurrences fall between the predetermined high level count and the low level count,

a latch circuit responsive to the output of the decoder, and

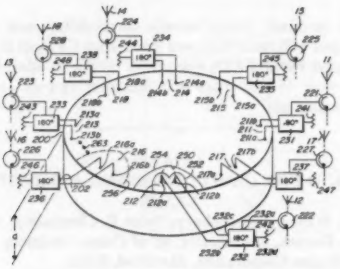
a code detect signal representing detection of a predetermined code signal, the latch circuit providing an output signal in response to the binary signal of the first state from the decoder and the code detect signal.

4,176,322

RADIO FREQUENCY LENS

Richard S. Kommrusch, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 29, 1977, Ser. No. 828,566
Int. Cl.[2] H01Q 3/26
U.S. Cl. 325—369 **23 Claims**



1. A radio frequency (RF) lens for receiving and focusing a plurality of RF signals, comprising:

a transmission cavity means, including a plurality of probe sites therein, the cavity being of predetermined construction to transmit RF signals among said probe sites;

a plurality of probe pairs, each pair predeterminedly positioned at each probe site;

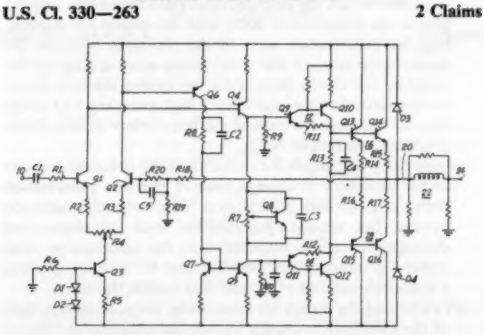
coupler means for coupling each one of said plurality of RF signals to one of said probe pairs, the coupler means coherently combining RF signals received by each probe of a probe pair to provide a first summed output and incoherently combining the RF signals received by each probe of the respective probe pair to provide a second difference output.

4,176,323

TRANSISTORIZED POWER AMPLIFIER

Robert Odell, Pasadena, Calif., assignor to Harman International Industries, Inc., Lake Success, N.Y.

Filed Jun. 21, 1978, Ser. No. 917,738
Int. Cl.[2] H03F 3/18, 3/30
U.S. Cl. 330—263 **2 Claims**



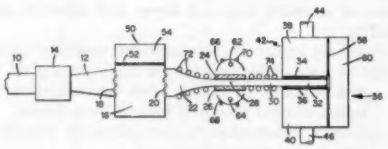
1. A transistor amplifier comprising an input, a push-pull driver transistor pair operatively connected to said input, first and second output stages, and first and second compound buffer stages respectively operatively connected intermediate the outputs of said push-pull driver and said first and second output stages, each of said first and second buffer stages comprising a first transistor and a second complementary transistor, the base of said first transistor being orperatively connected to an output of said push-pull driver, the collector of said first transistor being operatively connected to the base of said second transistor, the emitter of said first transistor being operatively connected to the collector of said second transistor, and the collector of said second transistor being operatively connected to an input of said output stage.

4,176,324

HIGH PERFORMANCE DYE LASER AND FLOW CHANNEL THEREFOR

Henry R. Aldag, Boston; Richard G. Morton, N. Reading, and Jaime A. Woodroffe, Andover, all of Mass., assignors to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Filed Sep. 20, 1976, Ser. No. 724,862
Int. Cl.[2] H01S 3/02
U.S. Cl. 331—94.5 T **12 Claims**



1. A flow channel for liquid fluent laser material of a laser comprising:

an input plenum positioned to receive a liquid fluent laser material;

a pair of optically transmissive windows in facing relationship to each other with generally parallel inner surfaces;

means for applying excitation radiation through said first and second windows;

a conduit for directing a continuous flow of fluent material from said input plenum to the region between said windows and transverse thereto, said conduit having walls bordering said continuous flow which provide a generally decreasing cross-sectional area between said input plenum and said windows;

the applied radiation producing heat of said conduit walls from radiation from the fluent material in the region between said windows;

means for abating temperature effects to reduce refractive index gradients in fluent laser material received by said input plenum within the region between said windows; said means comprising:

cooling ducts associated with said conduit and located adjacent and in thermal contact with said conduit walls at positions bordering said conduit flow at least upstream of and away from the region between said windows;

said ducts thus operative to cool said conduit walls in the region of said walls adjacent said windows and thus exposed to said heating by said radiation from the region between said windows and thereby to reduce temperature gradients in fluent laser material flowing past said windows;

an output plenum positioned to accept fluent laser material after flowing between said windows along an extension of said conduit;

means for exhausting fluent laser material from said output plenum.

4,176,325
SEMICONDUCTOR LASER DEVICE

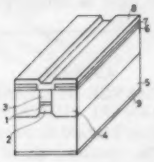
Takashi Kajimura, Kokubunji; Kazutoshi Saito; Noriyuki Shige, both of Hachioji; Michiharu Nakamura, Tokyo; Jun-ichi Umeda, and Masayoshi Kobayashi, both of Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 19, 1977, Ser. No. 843,365

Claims priority, application Japan, Oct. 22, 1976, 51-126044; Mar. 18, 1977, 52-29205

Int. Cl.[2] H01S *3/19*

U.S. Cl. 331—94.5 H **22 Claims**



1. A semiconductor laser device comprising:

a semiconductor substrate;

an optical confinement region formed of a semiconductor material assembly disposed above said substrate and including

a multilyaer semiconductor laminated structure formed of

a first semiconductor layer having a prescribed thickness which is no greater than the oscillation wavelength of light produced by said laser device,

a second semiconductor layer disposed beneath said first semiconductor layer, and

a third semiconductor layer disposed above said first semiconductor layer,

the refractive indices of said second and third semiconductor layers being lower than the refractive index of said first semiconductor layer, and the conductivity types of said second and third semiconductor layers being opposite each other, and

a fourth semiconductor layer having first and second portions disposed alongside and contacting opposite side faces of each of the first, second, and third semiconductor layers of said multilayer semiconductor laminated structure, so that said first semiconductor layer is buried within structure formed by said second, third, and fourth semiconductor layers, said fourth semiconductor layer having a band gap greater than that of said first semiconductor layer, and having a refractive index which is higher than the refractive indices of said second and third layers and which is higher than the effective refractive index of the buried first semiconductor layer;

a first electrode disposed upon one surface of said optical confinement region; and

a second electrode disposed upon one surface of said semiconductor substrate; and

means, including said optical confinement region, for forming a resonant optical cavity for optical radiation travelling in a direction parallel to said opposite side faces.

4,176,326
CF_4 LASER

Curt Wittig, Santa Monica, and Joe J. Tiee, Los Angeles, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 20, 1977, Ser. No. 844,086

Int. Cl.[2] H01S *3/223*

U.S. Cl. 331—94.5 G **8 Claims**

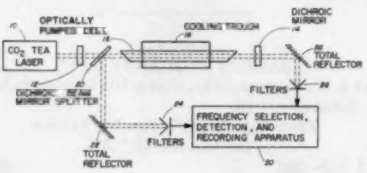
1. A laser for producing near 16 μm coherent radiation comprising:

line tunable CO_2 excitation means for emitting coherent radiation in the absorption spectrum of CF_4 molecular gas;

an optically pumped cell aligned with said CO_2 excitation means;

means for cooling said optically pumped cell;

molecular CF_4 gas retained within said optically pumped cell;



optical resonant cavity means surrounding said optically pumped cell such that said molecular CF_4 gas is optically pumped by said CO_2 excitation means to stimulate emission near 16 μm from the transition $\nu_2+\nu_4 \rightarrow \nu_2$ of CF_4 molecular gas.

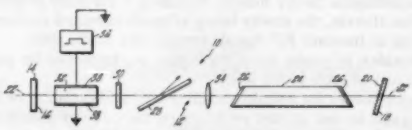
4,176,327
METHOD FOR CAVITY DUMPING A Q-SWITCHED LASER

Robert J. Wayne, Glastonbury; Peter P. Chenausky, Avon, and Carl J. Buczek, Manchester, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jan. 25, 1978, Ser. No. 872,274

Int. Cl.[2] H01S *3/11*

U.S. Cl. 331—94.5 M **13 Claims**



1. A method of obtaining pulses of radiation having pulse widths capable of being controllably variable over a submicrosecond time interval with a laser having a gaseous gain medium, means for controlling the polarization state of radiation capable of oscillating within the laser, and means responsive to the polarization state for coupling out radiation from the laser comprising:

energizing the gain medium to obtain a population inversion therein capable of providing continuous wave radiation oscillating within the laser;

providing a first polarization state, to at least a portion of radiation within the laser incident onto the means responsive to the polarization state, with the means for controlling the polarization state of the radiation wherein the means responsive to the polarization state is adapted for coupling out of the laser radiation having the first polarization state thereby providing a high coupling loss to the laser to maintain the gain of the laser below threshold for producing an output beam;

on switching the means for controlling the polarization state of the radiation to change quickly the first polarization state to a second polarization state wherein radiation having the second polarization state is transmitted through the means responsive to the polarization state thereby producing low coupling loss to the laser to allow a Q-switch buildup of optical flux within the laser;

off switching the means for controlling the polarization state of the radiation to change the second polarization state to the first polarization wherein the optical flux having the Q-switch buildup is cavity dumped by the means respon-

sive to the polarization state to obtain an output pulse having a submicrosecond duration; and

controlling the time duration of off switching the means for controlling the polarization state to control the pulse width of the output pulse.

4,176,328

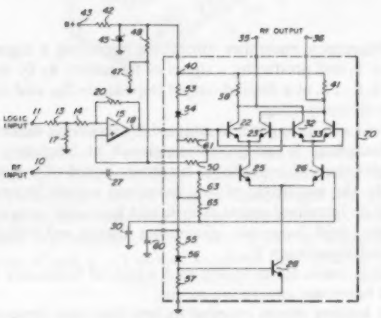
DC COUPLED BI-PHASE MODULATOR

Kenneth H. Brown, Scottsdale, and John W. Shepard, Chandler, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 30, 1978, Ser. No. 910,402

Int. Cl.[2] H04L *27/20*

U.S. Cl. 332—16 T **6 Claims**



1. A DC coupled bi-phase modulator comprising:

(a) a switching circuit having a signal input and output, a bias input and a control input wherein the switching circuit is a differential amplifier circuit with the bias input being coupled to cause a first mode of operation when the amplitude of a signal at the control input exceeds the predetermined bias at the bias input and a second mode of operation when the amplitude of the signal at the control input is less than the predetermined bias;

(b) comparing means having an output DC coupled to the control input of said switching means, a reference input coupled to the bias input of said switching means and a logic signal input; and

(c) bias means coupled to the bias input of said switching circuit for providing a predetermined bias thereon.

4,176,329

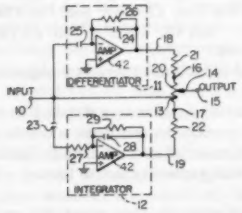
TONE CONTROL CIRCUIT

Jacob F. Moskowitz, Brookline, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 649,400, Jan. 15, 1976, abandoned. This application Jul. 11, 1977, Ser. No. 814,696

Int. Cl.[2] G10H *1/00*

U.S. Cl. 333—28 T **6 Claims**



1. An electronic tone control circuit comprising,

an integrator circuit having an input terminal and an output terminal,

a differentiator circuit having an input terminal and an output terminal,

first means for electrically connecting the input terminals of said integrator circuit and differentiator circuit to each other to provide the tone control circuit input terminal,

a potentiometer having end terminals, a wiper arm terminal, and a center-tap terminal,

second means for electrically connecting the output terminals of said integrator circuit and said differentiator circuit to said potentiometer end terminals, respectively; the wiper arm terminal providing the output terminal of said tone control circuit,

third means for electrically connecting said center-tap terminal of the potentiometer to the control circuit input terminal.

4,176,330

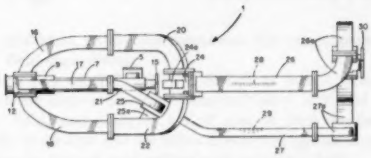
DIPLEXER APPARATUS

Joseph G. DiTullio, Woburn; Leonard I. Parad, Framingham, both of Mass., and Donald J. Sommers, Brookline, N.H., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 23, 1977, Ser. No. 863,808

Int. Cl.[2] H01P *1/16, 1/20, 5/20*

U.S. Cl. 333—122 **12 Claims**



1. Diplexer apparatus comprising:

first transducer means having first and second input ports and an output port, said first transducer means being operative to receive first and second signals within a first frequency bandwidth at the first and second input ports, respectively, and to establish said signals at the output port thereof to be orthogonal and linearly-polarized with respect to each other;

first polarizer means coupled to the first transducer means and operative to transform the orthogonal linearly-polarized signals at the output port of the first transducer means to orthogonal circularly-polarized signals;

electromagnetic wave conducting means having a first port coupled to the first polarizer means and a second port, said electromagnetic wave conducting means being operative to pass the circularly-polarized signals from the first polarizer means to the second port thereof, said electromagnetic wave conducting means further having third, fourth, fifth and sixth ports and being further operative to receive first and second circularly-polarized signals within a second frequency bandwidth at the second port thereof and to couple orthogonal vectoral components of said circularly-polarized signals to the third, fourth, fifth and sixth ports thereof;

first, second, third and fourth sections of waveguide respectively coupled to the third, fourth, fifth and sixth ports of the electromagnetic wave conducting means, said first and third sections of waveguide being operative to pass therethrough vectoral components of the c...cularly-polarized signals at the third and fifth ports of the electromagnetic wave conducting means and said second and fourth sections of waveguide being operative to pass therethrough orthogonal vectoral components of the circularly-polarized signals at the fourth and sixth ports of the electromagnetic wave conducting means;

first combining means having first and second inputs coupled respectively to the first and third sections of waveguide and operative to combine at an output thereof the

vectoral components in the first and third sections of waveguide derived from the first and second circularly-polarized signals;

second combining means having first and second inputs coupled respectively to the second and fourth sections of waveguide and operative to combine at an output thereof the vectoral components in the second and fourth sections of waveguide derived from the first and second circularly-polarized signals;

second and third polarizer means coupled respectively to the outputs of the first and second combining means and operative to introduce a predetermined phase shift differential between the vectoral components at the outputs of the first and second combining means, said second and third polarizer means respectively including first and second sections of rectangular waveguide each having a row of pins therein; and

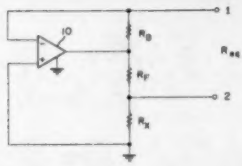
third combining means having first and second inputs coupled to the sections of waveguide of the second and third polarizer means, respectively, and operative in response to the vectoral components from the second and third polarizer means to establish at first and second outputs thereof first and second resultant orthogonal linearly-polarized signals each corresponding to a different one of the circularly-polarized signals.

4,176,331

NETWORK FOR SIMULATING LOW-NOISE-TEMPERATURE RESISTORS

Robert L. Forward, Oxnard, and Gary D. Thurmond, Calabasas, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 27, 1978, Ser. No. 881,296
Int. Cl.[2] H03H *11/00, 5/04*
U.S. Cl. 333—213 **6 Claims**



1. A two-terminal network for simulating a resistance comprising, in combination:

an amplifier having first and second differential input terminals, an output terminal and a common ground;

a first resistor R_D;

means for connecting said first resistor between said first differential input terminal and said output terminal;

second and third resistors R_F and R_X, respectively;

means for serially connecting said second and third resistors between said output terminal and ground;

means for connecting said second differential input terminal to ground;

one of said network terminals being connected to said first differential input terminal, the other of said network terminals being connected to the junction of said second and third resistors and

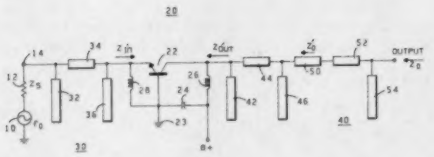
wherein the resistance simulated at said network terminals is substantially proportional to R_D.

4,176,332

FREQUENCY MULTIPLIER

Peter Bachert, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 18, 1977, Ser. No. 852,892
Int. Cl.[2] H01P *1/20;* **H03B** *19/14*
U.S. Cl. 333—218 **13 Claims**



1. A frequency multiplier circuit for receiving a signal of frequency f_0 and producing a signal of frequency $k_x f_0$, where $k=2, 4, 6, 8 \ldots$, at a desired output impedance Z_0, said multiplier circuit comprising:

harmonic generating means adapted for receiving said signal of frequency f_0 and producing signals at frequency harmonics thereof, including a harmonic signal of frequency $k \times f_0$, the amplitude of said harmonic signals increasing with an increased signal at f_0 in said harmonic generating means, said harmonic generating means exhibiting an output impedance Z_{out};

coupling means for coupling said signal of frequency f_0 to said harmonic generating means;

output loading means coupled to said harmonic generating means and providing a load circuit thereto, said output loading means comprising:

(a) first and second series coupled transmission line means for coupling said harmonic generating means produced harmonic signals to the multiplier circuit output, each of said first and second transmission lines having predetermined characteristic impedances for transforming the impedance to signals of frequency $k \times f_0$ at the input thereof to the desired output impedance Z_0 of said frequency multiplier, said first and second transmission lines having predetermined electrical lengths to provide a combined phase shift of 180° to signals of frequency $(2n-1) \times f_0$, where $n=1, 2, 3 \ldots$; and

(b) third transmission line means having an electrical length of one quarter wavelength at frequencies $(2n-1) \times f_0$, where $n=1, 2, 3 \ldots$, coupled to the output of said frequency multiplier such that a short at frequency f_0 is reflected thereto,

whereby the short at frequency f_0 at the output of the multiplier circuit is transformed to a high impedance at f_0 to the output of said harmonic generator.

4,176,333

MAGNETIC CORE FOR SINGLE PHASE ELECTRICAL INDUCTIVE APPARATUS

Saul Bennon, and William D. Albright, both of Muncie, Ind., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 12, 1978, Ser. No. 914,463
Int. Cl.[2] H01F *27/08, 27/26*
U.S. Cl. 336—60 **5 Claims**

1. Electrical inductive apparatus comprising:

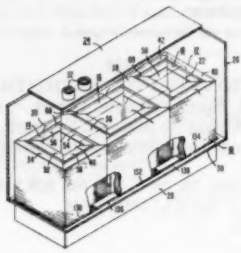
an enclosure;

a first magnetic core structure disposed in said enclosure and having n parallel leg portions and first and second yoke portions formed of stacked metallic laminations, said n leg portions being spaced apart to form $n-1$ apertures therebetween;

$n-1$ second magnetic core structures, each having leg and yoke portions formed of stacked metallic laminations, each of said $n-1$ second magnetic core structures being disposed in one of said apertures in said first magnetic core structure and spaced from adjoining leg and yoke portions

of said first magnetic core structure to form a gap completely therearound;

an electrical winding assembly disposed in inductive relation with said first and said n −1 second magnetic core structures; and



at least one support member having a flange portion mounted on the bottom of said enclosure and two parallel web portions extending vertically therefrom, said two parallel web portions being of equal length with each web portion extending into the gap between one of said legs of said first magnetic core structure and an adjacent leg of one of said n −1 second magnetic core structures.

4,176,334

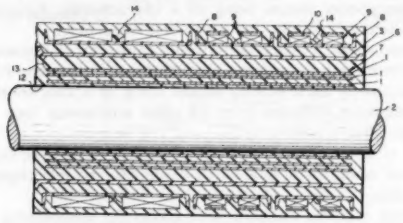
HIGH VOLTAGE TRANSFORMER AND PROCESS FOR MAKING SAME

Robert S. Buritz, Pacific Palisades; Robert D. Parker, Manhattan Beach; Jack J. Kisch, Huntington Beach, and John Burnham, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 607,513, Aug. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 477,870, Jun. 10, 1974, abandoned. This application Jun. 13, 1977, Ser. No. 805,662

Int. Cl.[2] **H01F** *15/04, 27/28*

U.S. Cl. 336—84 C **11 Claims**



1. A small, lightweight, high voltage transformer utilizing all solid dielectric insulation materials having a specific weight of less than three pounds per kilowatt of transformer power comprising a primary transformer winding disposed about a porous barrier insulation material impregnated with a dielectric resin, a conductively coated epoxy-glass laminate primary shield electrically connected to said primary winding and extending beyond said primary winding in the axial direction and having rounded ends which project in a radial direction away from said winding and maintained in a predetermined spaced relationship to said winding by said impregnated porous barrier insulation material, a conductively coated epoxy-glass laminate secondary shield maintained in a predetermined spaced relationship to said primary shield by said impregnated insulation material and electrically connected to a secondary transformer winding disposed about said secondary shield and an encapsulation system comprised of said dielectric resin which completely surrounds and encapsulates said transformer.

4,176,335

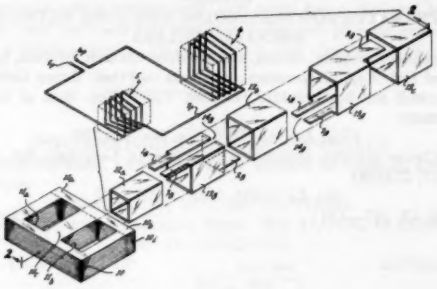
ELECTRICAL CONDUCTING APPARATUS

Douglass E. Charpentier, Pasadena, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Oct. 25, 1977, Ser. No. 845,120

Int. Cl.[2] **H01F** *27/28*

U.S. Cl. 336—180 **6 Claims**



1. An electrical conductor apparatus for encompassing a magnetic field comprising:

(a) a first pair of spiral shaped electrical strip conductors which are aligned along the longitudinal axis of said magnetic field, and wherein a first one of said conductors spirals clockwise and the other conductor spirals counterclockwise around said axis of said magnetic field,

(b) a second pair of spiral shaped conductors longitudinally aligned along said axis of said magnetic field and wherein a first one of said conductors spirals clockwise and a second one of said conductors spirals counterclockwise around said axis of said magnetic field,

(c) and wherein each of said pair of spiral conductors is insulated from the other and electrically connected such that each spiral pair of conductors forms a balanced pair of half-turn windings via output terminals at one end relative to a center tap at the opposite end which electrically connects said pair of spiral conductors.

4,176,336

LACQUER-ENCAPSULATED CARBON FILM RESISTOR

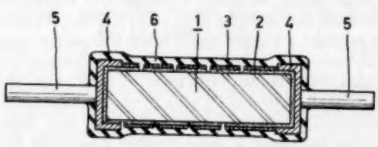
Peter J. T. Van Den Berk, and Gerrit Verspui, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 7, 1978, Ser. No. 913,292

Claims priority, application Netherlands, Jun. 27, 1977, 7707078

Int. Cl.[2] **H01C** *1/024, 1/032, 1/02;* **B05D** *5/12*

U.S. Cl. 338—274 **2 Claims**



1. A lacquer-encapsulated carbon film resistor comprising:

a ceramic substrate;

a carbon film deposited over the entire surface of said ceramic substrate;

an insulating layer of silicon nitride deposited substantially over the entire surface of said carbon film, only the electri-

cal connection portions of said carbon film being uncoated;

metal electrode caps positioned tightly against said carbon film at said electrical connection portions;

current conductors welded to said metal electrode caps to serve as leads;

a layer of epoxy resin lacquer coated over said entire carbon film resistor assembly except said leads to encapsulate said resistor.

4,176,337

APPARATUS FOR MEASURING THE TIME BETWEEN RECEIVED PULSES

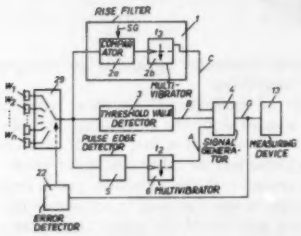
Burckhard Aechter, Achim, and Manfred Gerlach, Bremen, both of Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Fed. Rep. of Germany

Filed Jun. 13, 1978, Ser. No. 915,228

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1977, 2726981

Int. Cl.[2] G01S *9/68*; G01P *5/18*

U.S. Cl. 367—131 **9 Claims**



1. For use with a system in which successive pulses, each composed of a train of high frequency oscillations, are emitted by a transmitting transducer, propagated through a transmission medium, and received by a receiving transducer having a given transient behavior, a starting transient period followed by a steady-state response, and a given response band width, apparatus for measuring the time interval between reception of successive pulses by the receiving transducer and for preventing erroneous measurements resulting from propagation of the pulses over indirect paths through the transmission medium, said apparatus comprising:

threshold value detecting means connected to said receiving transducer for receiving the output signal therefrom representative of each pulse received by said receiving transducer, said detecting means having an associated threshold value which is a function of the peak value of the output signal produced by said receiving transducer during steady-state response to a pulse, and said detecting means producing a signal when the output signal from said receiving transducer exceeds said threshold value;

rise filter means including a comparator connected to receive the output signal from said receiving transducer and to produce a trigger signal when the output signal from said receiving transducer exceeds a comparision value which is substantially less than the peak value of the output signal produced by said receiving transducer during steady-state response to a pulse, said rise filter means further including a timer member connected to receive trigger signals from said comparator for producing, in response to each such trigger signal, a rise pulse having a period at least equal to the reciprocal of the band width of said receiving transducer and not greater than the starting transient period of said receiving transducer;

signal generator means connected to said threshold value detecting means and to said rise filter means for producing a signal indicating good reception of a pulse each time said detecting means produces a signal in time coincidence with a rise pulse; and

measuring means connected to receive the signals indicating good reception from said signal generator means and responsive thereto for providing an indication of the time interval between reception of successive pulses by said receiving transducer.

4,176,338

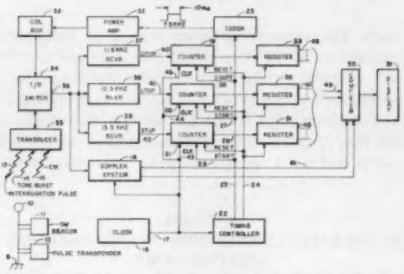
HIGH RESOLUTION ACOUSTIC NAVIGATION SYSTEM

Robert C. Spindel, North Falmouth; Robert P. Porter, West Falmouth, and William M. Marquet, Falmouth, all of Mass., assignors to Woods Hole Oceanographic Institution, Woods Hole, Mass.

Filed Aug. 31, 1977, Ser. No. 829,344

Int. Cl.[2] G01S *5/18*

U.S. Cl. 367—6 E **10 Claims**



1. A high resolution underwater acoustic navigation system comprising, in combination:

an object whose movement through water is to be tracked and a plurality of geographically fixed underwater devices;

interrogation means on said object for periodically transmitting acoustic interrogation pulse tones and transponder means at each of said underwater devices for transmitting an acoustic tone burst in response to reception of an interrogation pulse tone, the tone burst transmitted by each transponder means being of a characteristic frequency different from all other tone burst frequencies;

beacon means at each underwater device for continuously transmitting an acoustic tone, the continuous tone transmitted by each beacon means being of a characteristic frequency different from all other continuous tone frequencies;

first receiver means at said object for determining the reception times of said tone bursts relative to said interrogation pulse;

second receiver means at said object for determining the Doppler shifts of the acoustic tones as received from each underwater device; and

computer means connected to said first and second receiver means for determining a reference position of said object based upon said reception times and then tracking movement of said object from said reference position based upon said Doppler shifts.

4,176,339

PROPAGATION SAMPLED ACOUSTIC LINE ARRAY

William L. Konrad, Niantic, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

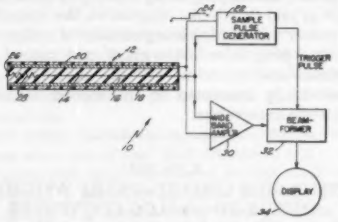
Filed Feb. 2, 1978, Ser. No. 874,453

Int. Cl.[2] G01S *3/80*

U.S. Cl. 367—121 **8 Claims**

1. An acoustic line array for detecting an acoustic source in a medium which comprises:

a center conductor extending along the array axis for the length of the array;
a flexible material having pressure dependent dielectric constant surrounding said center conductor;
a conducting shield generally concentric with said center conductor;
a resistive means for eliminating signal reflections being connected to a first end of said center conductor;
a pulse generator being connected to second end of said



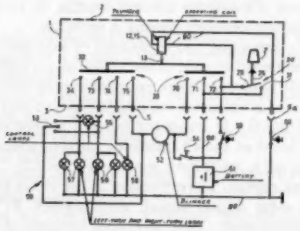
center conductor, said pulse generator also generating trigger pulses;
an amplifying means for amplifying the reflected signals being connected to the second end of the center conductor;
a beam former having the input thereof from the output of said amplifying means and having the trigger pulses from said pulse generator for triggering thereof; and
a displaying means being connected to the output of said beam former for displaying the output thereof.

4,176,340

SHOCK-RESPONSIVE ACTIVATING DEVICE FOR EMERGENCY FLASHER SYSTEMS OF AUTOMATIVE VEHICLES

Albert Steinmeier, Ringweg 7, D-7972 Isny-Neutrauchburg, Fed. Rep. of Germany

Filed Feb. 13, 1978, Ser. No. 877,472
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1977, 2706962
Int. Cl.² G08B *21/00*
U.S. Cl. 340—52 H **9 Claims**



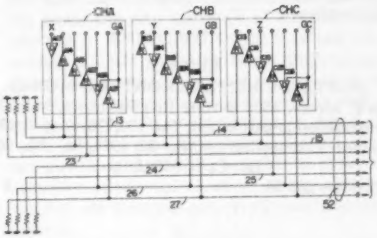
1. The combination of an emergency flasher system which is installed in an automotive vehicle and comprises electric circuit means arranged to furnish a series of signals in response to completion thereof, with a shock responsive activating device including a housing which constitutes an upright cylinder and is secured to the vehicle, a normally open circuit-completing first switch in said housing, an iron plate in said housing, a tiltable activating element disposed at one side of said plate and including a permanent magnet which normally adheres to said plate but permits temporary tilting of said activating element in response to the application of a shock of predetermined magnitude, a normally open second switch in said housing, a relay installed in said housing and including a coil in circuit with said second switch so that said coil is energized on closing of said second switch and a plunger displaceable on energization of said coil to thereby close said first switch and complete said circuit means, said relay further including a spool for said coil, said spool being adjacent to the other side of said plate, movable means for closing said second switch in response to tilting of said activating element to thereby energize said coil, said plate having a central opening for said closing means and said spool also having a central opening for said closing means, a holding circuit for said relay, said first switch including means for completing said holding circuit on closing of said first switch by said plunger, and means for biasing said plunger to a position in which said plunger permits said first switch to open when said coil is deenergized, said spool being disposed between said plate and said first switch and said plunger including a tubular member through which said closing means extends.

4,176,341

INFORMATION TRANSFER APPARATUS

Michio Miyazaki, Odawara, Japan, assignor to Hitachi, Ltd., Japan

Filed Apr. 27, 1977, Ser. No. 791,186
Claims priority, application Japan, May 12, 1976, 51-53297
Int. Cl.² H04Q *9/00*
U.S. Cl. 340—147 LP **4 Claims**



1. An information transfer apparatus for connecting between plural channels and at least one input/output control device, comprising a plurality of channel out signal lines each connected to a particular channel to be driven by that particular channel to apply a connection request signal identifying the particular channel to the at least one input/output control device and each of said channel out signal lines also being coupled in common with the remaining channels other than said particular channel to indicate to the remaining channels when the particular channel has applied a connection request signal to the at least one input/output control device.

4,176,342

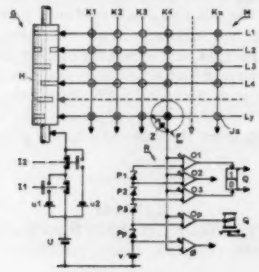
ELECTRICAL CONTROL SYSTEMS FOR TRANSMITTING SIGNALS OF DIFFERENT MAGNITUDES

Andre Gendrot, 78 Boulevard Ornano, 75018 Paris, France

Filed Dec. 22, 1977, Ser. No. 863,323
Claims priority, application France, Dec. 24, 1976, 76 39037
Int. Cl.² H04Q *3/00*
U.S. Cl. 340—166 R **9 Claims**

1. In a system for providing controls according to a given code and/or program, a matrix composed of a plurality of mutually insulated electrically conductive lines and a plurality of mutually insulated electrically conductive columns which cross said lines at predetermined locations, and a plurality of connecting means respectively situated at said locations for selectively electrically connecting said lines and columns to each other at said locations where they cross each other, supply means electrically connected with said lines for supplying a given group of input signals thereto, and receiving means electrically connected with said columns for detecting a given group of output signals received from said columns and for

providing predetermined controls in accordance with said group of detected signals received from said columns, said plurality of connecting means respectively including connecting circuits each of which includes a Zener diode connected in an inverse position between a line and column, and said Zener diodes having threshold voltages respectively distributed



among a plurality of different threshold voltages which respectively have different discrete magnitudes, and at least one of said groups of signals also having voltages distributed among a plurality of signal voltages which respectively have different discrete magnitudes corresponding to said magnitudes of said threshold voltages.

4,176,343

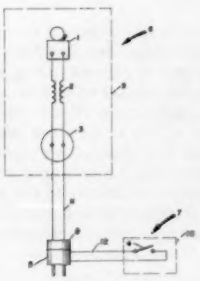
PORTABLE REMOTE CONTROL SIGNAL

Charles F. Moore, 3306 Beverly Rd., Baltimore, Md. 21214

Continuation-in-part of Ser. No. 792,778, May 2, 1977, abandoned. This application May 23, 1978, Ser. No. 908,695

Int. Cl.[2] G08B *3/00*

U.S. Cl. 340—286 R **8 Claims**



1. A portable remote control signaling device, comprising,

an alarm means;

a remote control means;

an electrical conductor system electrically connected to said alarm means and to said remote control means for activating said alarm means;

said electrical conductor system consisting of:

a first length of two-wire electrical conductor;

an electrical junction box connected to one end of said two-wire electrical conductor;

a first portable base for said junction box and said alarm means;

an electrical transformer affixed to said portable base, with the low voltage side of said transformer being connected to said alarm means, and the high voltage side of said transformer being connected to said junction box;

an electrical plug affixed to the second end of said two-wire electrical conductor;

a second length of two-wire electrical conductor, the first end of which is connected to said remote control means, a second portable base having said remote control means affixed thereto; and

an electrical power source having a plug with a pair of prong-like connecting means on one side thereof, and a pair of sheath-like receptacle connecting means on the opposite side thereof, said prong-like connecting means being electrically connected to said power source, said electrical plug being connected to said second end of first two-wire electrical conductor and being inserted in said sheath-like receptacle connecting means, the first prong of said power source plug being directly connected to a first sheath of said sheath-like receptacles, the second prong of said power source plug being connected within said power-source plug to a first wire of said second two-wire conductor and second wire of said second two-wire conductor being connected to the second sheath of said sheath-like receptables.

4,176,344

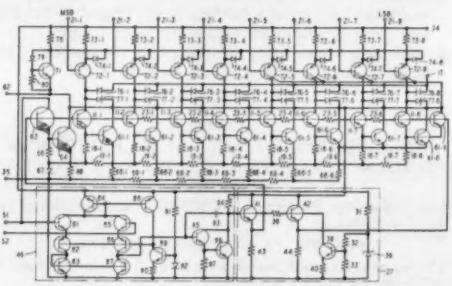
INTEGRATED CIRCUIT BINARY WEIGHTED DIGITAL-TO-ANALOG CONVERTER

Veikko R. Saari, Spring Lake Heights, and Masakazu Shoji, Warren, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 28, 1975, Ser. No. 581,623

Int. Cl.[2] H03K *13/02*

U.S. Cl. 340—347 DA **8 Claims**



1. An integrated circuit digital-to-analog converter for developing an analog output signal in response to an applied n-bit digital signal comprising;

a plurality of n transistor current sources S_i, i=1,2, . . . n;

an R-2R ladder network having n sections;

means for connecting the i^{th} section of said ladder network to the emitter electrode of the i^{th} transistor current source, said R-2R ladder network establishing the current level of each of said n transistor current sources so that the current level of the (i+1) transistor current source is I/2 of the current level of the i^{th} transistor current source;

a plurality of n switching means, T_i, i=1,2, . . . n, each switching means, T_i, responsive to the i^{th} bit signal of said applied n-bit digital signal, each switch T_1 connecting each current source S_i to an output terminal of said digital-to-analog converter circuit whenever said i^{th} bit signal assumes a predetermined binary quantity;

a plurality of n-1 resistors, R_i, i=1,2, . . . (n-1), having substantially equal resistance values, each resistor R_i connected between the base electrodes of transistor current sources S_i and $S_{(i+1)}$;

an additional transistor current source having substantially the same transistor geometry as said n transistor current sources, the base electrode of said additional current source connected to the base electrode of transistor current source S_i;

an additional R-2R ladder section connected to said n section R-2R ladder network and to the emitter electrode of said additional transistor current source transistor;

a temperature-dependent voltage supply circuit including a

first and second transistor with the collector electrodes thereof connected to a first bias terminal and the emitter electrodes thereof respectively connected to a second bias terminal by a first and second resistor, a third resistor connected between said first bias terminal and the base electrode of said first transistor, a fourth resistor connected between the base electrodes of said first and second transistors, and a third transistor with the collector electrode thereof connected to said base electrode of said second transistor and the emitter electrode of said third transistor connected to said second bias terminal by a fifth resistor;

said emitter of said first transistor further connected to said base electrode of said additional transistor current source, and said emitter electrode of said second transistor further connected to the base electrode of transistor current source Sn;

circuit means for supplying a predetermined voltage to the base electrode of said third transistor; and

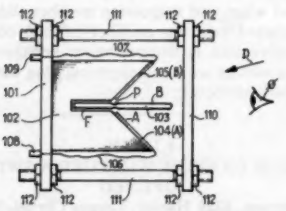
an operational amplifier circuit having an inverting input terminal, a noninverting input terminal, and an output terminal, said noninverting input terminal commonly connected to a reference terminal and to the collector electrode of said additional transistor current source, said inverting input terminal connected to a terminal of fixed potential, and said operational amplifier output terminal connected to the base electrode of said first transistor.

4,176,345

REFLECTING ELECTROSTATIC DISPLAY CELL

François Micheron, and Jean-Luc Bruneel, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jan. 3, 1978, Ser. No. 866,340
Claims priority, application France, Jan. 4, 1977, 77 00077
Int. Cl.[2] G08B 5/00
U.S. Cl. 340—373 **16 Claims**



1. A reflecting electrostatic display cell for presenting under the control of a control signal two stable configurations, said cell comprising:

a dihedral block having two dihedral surfaces departing from a dihedral edge;

two electrodes extending onto respectively said two dihedral surfaces;

an electret member having a permanently applied electrostatic charge secured to said edge; and

means for electrically coupling said control signal to said electrodes.

4,176,346

SMOKE ALARM NETWORK

Arven Johnson, Kansas City, North, and Willene Stapleton, Platte City, both of Mo., assignors to John O. Stapleton, Platte City, Mo., a part interest

Filed Nov. 21, 1977, Ser. No. 853,119
Int. Cl.[2] G08B 25/00, 17/10
U.S. Cl. 340—524 **10 Claims**

1. A smoke alarm network comprising:

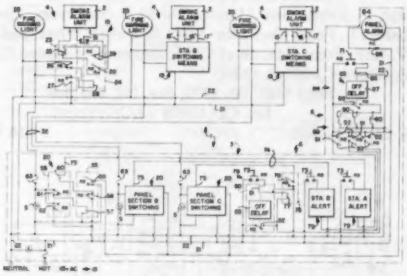
(a) a plurality of stations;

(b) a smoke alarm unit operatively installed at each of said stations, said unit including in a common housing a smoke alarm circuit having an electrical output upon detection of smoke thereby, and an alarm sounding device connected to said circuit within said housing and powered by said electrical output to give audible warning at the station thereof, said smoke alarm unit including means for the remote activation of said sounding device in the absence of smoke;

(c) a control panel remote from said stations;

(d) alarm indicators on said control panel, said alarm indicators being associated respectively with said stations;

(e) switching means having each smoke alarm circuit, each sounding device and means for remote activation thereof,



and each alarm indicator connected thereto, said switching means effecting activation of said alarm indicator in response to the electrical output from said smoke alarm circuit, and said switching means cooperating with the means for remote activation of said sounding device;

(f) a network power source connected to said switching means and providing operating power therefor; and

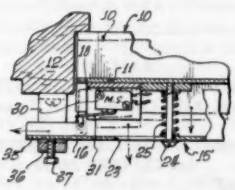
(g) alert switch means on said control panel, connected to said switching means, and operable to effect the remote activation of selected sounding devices not already activated by the electrical outputs of associated smoke alarm circuits.

4,176,347

RESTRAINING BAR WITH ALARM

Lorraine E. McIntyre, 828 S. Los Robles, Pasadena, Calif. 91106

Filed May 9, 1977, Ser. No. 794,826
Int. Cl.[2] G08B 13/06
U.S. Cl. 340—545 **9 Claims**



1. An alarm device mounted between a door and its latch frame-casement and activated by a slight movement of the door from its closed position when the device is in its locked configuration, said alarm device comprising:

an inwardly opening door having an inside surface and an outside surface, said door being mounted in a doorframe having a hinge-frame casement and a latch frame casement;

support means affixed against the inside surface of the door;

bar means pivotally and slidingly held by said support means near the end of said support means which is farthest from the latch-frame casement, said bar means being held against the inside surface of the door and having one end

affixed in a detachable manner to said latch-frame casement;

switch means held between said support means and said bar means, said switch means being activated by a slight movement of said bar means toward said support means; and

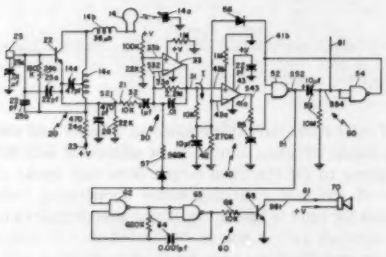
alarm means activated by said switch means whereby an attempt to open said door, when said bar means is affixed to said latch-frame casement, causes said alarm to sound.

4,176,348

ELECTRONIC SECURITY DEVICE

Joseph J. Tobin, San Marcos; David B. Robinson, Carlsbad; Robert L. Peay, Encinitas; Jerry R. Powell, Vista, and Leslie W. Gay, Escondido, all of Calif., assignors to Coded Communications, Carlsbad, Calif.

Filed Mar. 30, 1978, Ser. No. 891,505
Int. Cl.[2] G08B *13/26*
U.S. Cl. 340—562 **14 Claims**



1. A portable electronic device for detecting the presence of absence of objects, said device being comprised of first circuit means for capacitively coupling to any objects within a zone surrounding said first circuit, second circuit means connected to said first circuit means for generating output signals indicating changes in said capacitive coupling, and third circuit means connected to said second circuit means for receiving said output signals and for taking predetermined action when said output signals indicate an intrusion of objects into or movement of objects within said zone, wherein said first circuit means is an antenna comprised of a wire in the shape of a loop for placement onto a doorknob and wherein said wire is covered with an insulator such that said antenna capacitively couples to said doorknob without being in physical contact therewith.

4,176,349

INTRAVENOUS ALARM SYSTEM

Martin S. Fliegel, 8213 Oakdale Ave., Canoga Park, Calif. 91306

Filed Dec. 5, 1977, Ser. No. 857,291
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—613 **9 Claims**

1. A monitoring apparatus comprising:

(a) a container having a top member and a bottom member;

(b) an attaching member for attaching said container to an associated support such that said container extends downward thereform in a generally vertical configuration, said attaching member coupled to said container adjacent said top member;

(c) a plurality of electrical sockets disposed through said container, each said socket adapted to accept an associated electrical plug;

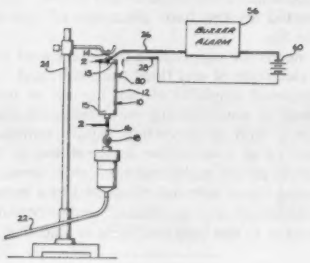
(d) an elongated suspension member slideably disposed in said container adjacent to and extending through said bottom member, said suspension member having:

(i) a shaped section arranged and configured to selectively engage a dispensing container, said shaped section disposed on said suspension member adjacent the bottom thereof, and

(ii) an actuator disposed on said suspension member adjacent the top thereof and having an electrically conductive surface, said surface arranged and configured to selectively engage said electrical plug;

(e) a helical spring disposed in said container, circumferically disposed about said suspension member so as to be journalled between said actuator and said bottom of said container; and

(f) an alarm circuit system, said alarm system having an alarm device electrically coupled to said electrical plug, said electrical plug arranged and configured to be selectively dis-



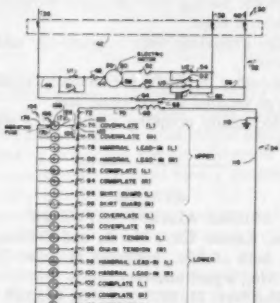
posed in one of said sockets and extend through said container so as to limit the upward movement of said suspension member by selectively engaging said conductive surface on said actuator, said alarm system further being electrically coupled to said conductive surface on said actuator whereby when said suspension member and said actuator are disposed downward, said helical spring is compressed and said actuator disengages said electrical plug thereby deactivating said circuit, and when said suspension member slideably travels upward toward said top member of said container, said upward movement is stopped upon engagement of said conductive surface with said electrical plug thereby activating said alarm device.

4,176,350

INDICATOR TO SHOW WHETHER A SWITCH HAS OPENED

Billy J. Patterson, 6326 Hanley, Corpus Christi, Tex. 78412

Filed May 18, 1977, Ser. No. 798,108
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—644 **18 Claims**



1. A machine comprising

an electric motor and a circuit for energizing the motor;

a multiplicity of normally closed switches in the circuit for monitoring the operation of the machine any one of which opens in response to the occurrence of an event to shut off the motor and which are capable of reclosing in response to the cessation of the event to place the motor in a condition to restart;

means enabling restarting of the motor upon reclosing of an opened switch; and

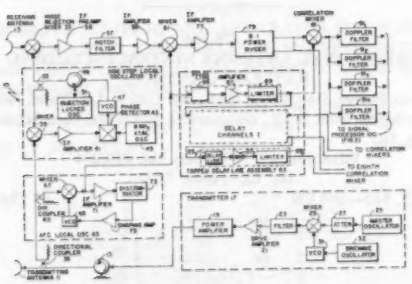
means for indicating which of the multiplicity of switches has opened regardless of whether the open switch has reclosed, including a multiplicity of indicators each of which comprises conductive means in circuit with an associated one of the switches in the switch open position which is rendered nonconductive upon opening of its associated switch and upon passage of a given electrical load therethrough and means rendered distinctly different in appearance upon passage of the given electrical load through the conductive means;

each associated switch being arranged in circuit with its associated conductive means for delivering the given electrical load therethrough upon switch opening.

4,176,351
METHOD OF OPERATING A CONTINUOUS WAVE RADAR

Alphonse J. DeVita, Chelmsford; Earl J. Koester, Bedford; David V. Manoogian, Lynnfield, and Stanley Sharenson, Stoneham, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Aug. 18, 1978, Ser. No. 935,051
Int. Cl.[2] G01S 9/37, 9/44
U.S. Cl. 343—9 R **3 Claims**



1. The method of operating a continuous wave radar to allow measurement of range and range rate of a moving target in the presence of clutter, such method comprising the steps of:

(a) frequency modulating a radio frequency carrier with a sinusoidal modulation signal and transmitting the resulting signal;

(b) downconverting echo signals to first intermediate frequency signals in a band centered on a first intermediate frequency and attenuating any echo signals adjacent such frequency;

(c) upconverting the remaining portions of the first intermediate frequency signals to produce second intermediate frequency signals and correlating such signals with differently delayed replicas of the sinusoidal modulation signals to produce a plurality of correlation signals;

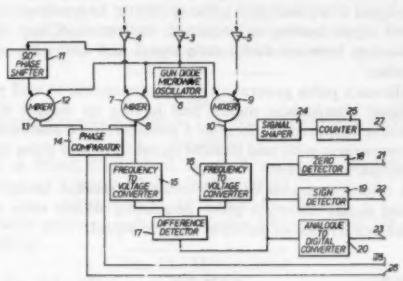
(d) time multiplexing, in accordance with the Doppler frequency of the individual correlation signals, the frequency components of each one of the correlation signals to produce successive sets of target indicating signals; and

(e) processing the target indicating signals to determine the range and range rate of a target.

4,176,352
APPARATUS FOR DERIVING INFORMATION CONCERNING THE MOVEMENTS OF A VEHICLE

Ronald A. Tyler, Chelmsford, England, assignor to The Marconi Company Limited, Chelmsford, England

Filed Dec. 31, 1975, Ser. No. 645,714
Claims priority, application United Kingdom, Jan. 2, 1975, 15/75
Int. Cl.[2] G01S 9/50
U.S. Cl. 343—9 R **1 Claim**

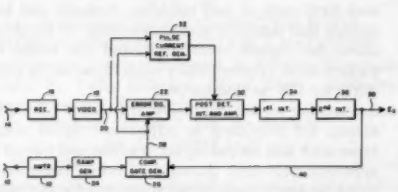


1. An apparatus for deriving information concerning the movements of a surface-borne vehicle comprising means for illuminating the surface over which the vehicle is to travel with electro-magnetic energy, means for receiving reflected electro-magnetic energy from a portion of said illuminated surface to one side of a line extending along the length of said vehicle, means for receiving electromagnetic energy from another portion of said illuminated surface to the other side of said line, means for deriving the Doppler frequency components in the energy received by each receiving means, means for utilizing said two Doppler frequency components to provide information concerning the movement of said vehicle over said surface, means provided for feeding, via a 90° phase shifter, a portion of the electro-magnetic energy received by one of said receiving means to a further means for deriving the Doppler frequency component therein and phase comparator means having one input derived from said further Doppler frequency component deriving means and a second input derived from that one of said first-mentioned two Doppler frequency component deriving means which is associated with that one of the receiving means, whereby said last-mentioned phase comparator provides one output signal if said vehicle is travelling in a forward directon and a different output signal if said vehicle is travelling in a reverse direction, in dependence upon the phase relationship of the signals at its input.

4,176,353
RADAR ALTIMETER TRACKING CIRCUIT APPARATUS

Robert P. Pearson, Roseville, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 747,667, Dec. 6, 1976, abandoned. This application Feb. 24, 1978, Ser. No. 880,909
Int. Cl.[2] G01S 9/12
U.S. Cl. 343—12 A **7 Claims**



4. A radar altimeter for determining the altitude of a craft

above a surface which altimeter includes a signal transmitter, a signal receiver which is adapted to produce a return signal following a signal transmission by the signal transmitter and a closed loop tracking circuit, the improvement comprising:

a gate pulse generator connected in said tracking circuit to form a part thereof and to an output of said transmitter to produce a gate signal pulse positioned in time to represent a previous altitude determination;

pulse signal comparison means connected in said tracking circuit to form a further part thereof and to receive on inputs thereof a return signal from said signal receiver and a signal from said gate pulse generator to produce a control signal having an amplitude indicative of any signal overlap between said return signal and said gate signal pulse;

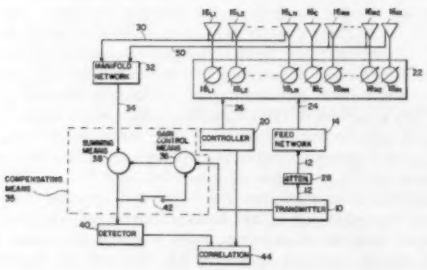
a reference pulse generating source connected to said pulse signal comparison means and having an output signal whose amplitude represents a predetermined standard for comparison with said control signal from said pulse signal comparison means;

and reference signal control means connected to activate said signal reference pulse generating source only upon the occurrence of an input control signal.

4,176,354
PHASED-ARRAY MAINTENANCE-MONITORING SYSTEM

James K. Hsiao, Oxon Hill, Md., and J. Paul Shelton, Arlington, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 25, 1978, Ser. No. 937,310
Int. Cl.[2] G01S 7/40
U.S. Cl. 343—17.7 **8 Claims**



1. In a radar system of the type wherein radio-frequency signals generated by a transmitter are propagated in a desired radiation pattern from an array antenna including a plurality of radiating elements, each radiating element having a different associated phase-shifting element, a maintenance monitoring system comprising:

control means for controlling the initial settings of the phase-shifting elements to provide an initial radiation pattern and thereafter selectively controlling the settings of the phase-shifting elements associated with symmetrically located pairs of radiating elements;

manifold means for receiving a portion of the signals radiated from each of said radiating elements and having an output, said manifold means operating on input signals to cause the signals received during the initial radiation pattern from symmetrically located radiating elements to differ by 180° at said output;

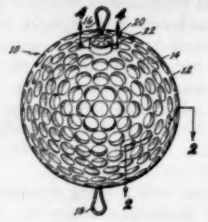
compensating means, coupled to the output of said manifold means, for providing an adjustment signal which combines with said output signal to adjust said output signal to approximately zero during said initial radiation pattern, said adjustment signal being maintained at the value which provided said zero output signal during said initial radiation pattern; and

detection means coupled to said adjusted output signal for indicating said adjusted output signal.

4,176,355
RADIATION REFLECTING TARGET SURFACE

Stanley R. Harris, 710 Washington St., Venice, Calif. 90291

Filed Jan. 12, 1978, Ser. No. 868,893
Int. Cl.[2] H01Q 15/18
U.S. Cl. 343—18 C **20 Claims**



1. A radiation reflector target for use on substantially non-reflective objects, comprising:

a radar reflective sphere having a substantially spherical surface;

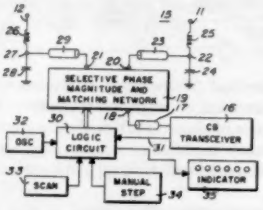
a plurality of radar reflective dimples indented from said substantially spherical surface, each dimple having a right angle corner and defining an opening substantially at the surface of said sphere which opening defines a maximum cross-dimension less than the wavelength of radar frequencies to be received; and

mounting means rotatably coupled to said sphere, and extending beyond said sphere, for connecting said target to an object.

4,176,356
DIRECTIONAL ANTENNA SYSTEM INCLUDING PATTERN CONTROL

L. Curtis Foster, Barrington Hills, and Carl E. Lindholm, North Barrington, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 27, 1977, Ser. No. 810,234
Int. Cl.[2] H04B 7/00
U.S. Cl. 343—100 CS **49 Claims**



1. A directive antenna system comprising:

a motor vehicle movable in a straight line direction;

first transceiver communication means carried by said motor vehicle and operative at a first frequency for establishing communications with a site remotely located from said first communication means;

second communication means carried by said vehicle and operative at a second frequency for establishing communications with other remote sites;

a plurality of at least two antenna elements mounted to said vehicle and selectively coupled to said first and second communication means for providing radiation patterns for said first and second communication means;

said two antenna elements positioned on said motor vehicle

at approximately one quarter of a wavelength apart at the operating frequency of said first transceiver communication means, said two antenna elements mounted along a line substantially parallel to the straight line direction of movement of the motor vehicle;

means including a network coupled to said antenna elements for selectively generating and maintaining any one of a plurality of at least two discrete directive radiation patterns for said first transceiver communication means by simultaneously utilizing said two antenna elements while selectively providing various phase differences between said utilized antenna elements and simultaneously providing for substantially equal magnitude current coupling between said utilized antenna elements and said first communication means, said network also selectively utilizing each one of said two antenna elements to simultaneously generate a separate radiation pattern for each of said first and second communication means, respectively,

said plurality of directive radiation patterns for said first communication means including at least two radiation patterns which have substantial nulls directed in substantially different directions;

first means for indicating which one of said plurality of directive radiation patterns is selectively generated for said first communication means; and

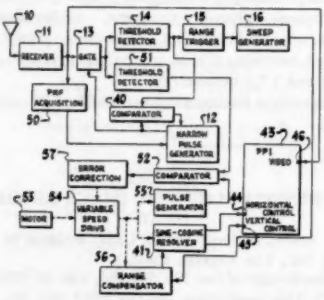
second means for indicating the magnitude of a desired signal transmitted at said remote site and received by said first communication means in the selected directive radiation pattern; and

means coupled to said network for automatically selecting one of said directive radiation patterns as an optimum pattern for said first communication means, said automatically selected optimum radiation pattern corresponding to the one pattern of said plurality of directive patterns in which a desired signal is most strongly received by said first communication means.

4,176,357
PASSIVE METHOD AND APPARATUS FOR RADAR LOCATING AND PARASITIC SURVEILANCE

David Fales, III, Baltimore, Md., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Jan. 25, 1960, Ser. No. 4,563
Int. Cl.² G01S *5/02*
U.S. Cl. 343—112 R **20 Claims**

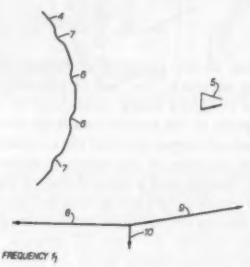


1. Receiving apparatus capable of passively locating a remote emitting radar comprising, receiving means for intercepting and amplifying the pulses and echo signals from the radar so as to produce a video output, gate circuit means connected to receive said video output, gate control circuit means connected to energize said gate circuit means when reception of unreflected main power pulses from the emitting radar is anticipated so that the output of said gate circuit will be a series of pulses corresponding to said main power pulses, range sweep circuit means connected to receive said series of pulses from said gate circuit means and to produce a range sweep output for each of said pulses, indicator means connected to receive said range sweep output, circuit means designed to produce an azimuth sweep output in synchronization with each of said main power pulses received with maximum amplitude from the emitting radar, said azimuth sweep circuit means being connected so as to introduce said azimuth sweep output to said indicator means, and means for connecting said video output of said receiving means to said indicator means, said indicator means being designed to correlate said range sweep output, said azimuth sweep output, and said video output so as to present an indication representative of the radar map that could be observed at the emitting radar whereby the location of the emitting radar can be passively determined and the area surrounding the radar can be kept under passive surveillance.

4,176,358
REFLECTOR ANTENNA WITH MATCHED FEED SYSTEM

Peter J. Wood, Chelmsford, England, assignor to The Marconi Company Limited, Chelmsford, England

Filed Nov. 17, 1977, Ser. No. 852,483
Claims priority, application United Kingdom, Nov. 18, 1976, 48030/76
Int. Cl.² H01Q *19/14*
U.S. Cl. 343—782 **10 Claims**



1. An antenna suitable for operation in at least two bands centered on respective frequencies comprising a circularly symmetric reflector arranged to be illuminated from a feed source of electromagnetic radiation and characterised in that the reflector has a number, equal to the number of bands, of perturbation reflectors arranged about the center of symmetry of the reflector, which perturbation reflectors being arranged integrally with the circularly symmetric reflector and in which the radial width of the perturbation reflectors and the displacement of their reflecting surfaces from the nominal profile of the reflector are small as compared with the radial distance between different adjacent perturbation reflectors, each perturbation reflector being arranged to provide a respective perturbation reflection having a magnitude dependent on the size of that perturbation reflection and a phase dependent on the position of the perturbation reflection such that at the feed source the magnitudes and phases of the perturbation reflections combine, at each frequency, substantially to cancel out the reflection due to the nominal profile of the reflector.

4,176,359
MONOPULSE ANTENNA SYSTEM WITH INDEPENDENTLY SPECIFIABLE PATTERNS

Matthew Fassett, Billerica; Seymour B. Pizette, Framingham, and John F. Toth, Billerica, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jul. 18, 1977, Ser. No. 816,421
Int. Cl.² H01Q *3/26*
U.S. Cl. 343—854 **4 Claims**

1. A monopulse antenna adapted to provide independently specifiable sum, azimuth and elevation antenna patterns, such antenna comprising:

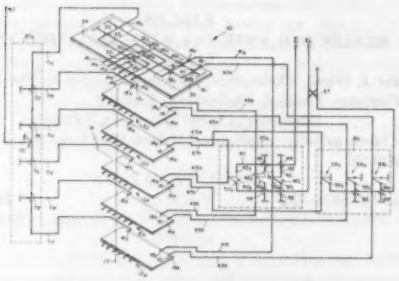
(a) a plurality of rows of antenna elements;

(b) a plurality of feed networks, each one thereof coupled to a corresponding one of the rows of antenna elements and having: First, second and third feed ports; and means for coupling energy between the feed ports and the antenna elements coupled thereto with three independent amplitude and phase distributions, each one of such feed networks comprising:

(i) a first coupling network coupled to the first and second feed ports and having a plurality of output ports;

(ii) a second coupling network coupled to the third feed port and having a plurality of output ports; and

(iii) a plurality of couplers, each one having an "in phase" port, an "out of phase" port and a pair of output ports, the "in phase" ports of the plurality of couplers being



connected to the plurality of output ports of the first coupling network, the "out of phase" ports of the plurality of couplers being connected to the plurality of output ports of the second coupling network, a first one of the pair of output ports of the couplers being coupled to a first portion of the antenna elements in the row coupled thereto and a second one of the pair of output ports of the couplers being coupled to a second portion of the antenna elements in the row coupled thereto, the first and second portions of antenna elements being disposed symmetrically about an azimuth axis; and

(c) means for coupling energy between the first, second and third feed ports of the plurality of feed networks and sum, azimuth and elevation antenna ports with independent amplitude and phase distributions to provide the independent sum, azimuth and elevation antenna patterns.

4,176,360

ANTENNA DEPLOYMENT MECHANISM FOR USE WITH A SPACECRAFT

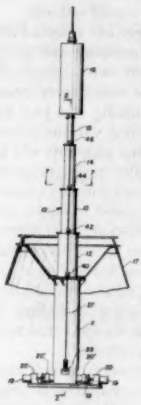
William A. Leavy, and Charles R. Griffin, both of Bowie, Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 18, 1978, Ser. No. 943,088

Int. Cl.[2] **H01Q** *1/10, 1/12*

U.S. Cl. 343—883 **17 Claims**

1. In an antenna structure, a relatively stationary support, a multi-section extensible and retractable antenna mast including base, intermediate mast sections and an innermost mast section having telescoping engagement, the base section of said antenna mast being fixed to said support, power drive means connected with said base section and including a rotary drum, a flexible element engaging said drum and windable thereon and being reeved over guide elements of the base and intermediate antenna mast sections, a terminal member for the ends of said flexible element and fixed thereto and spanning the interior end of the innermost mast section and adapted to drive the innermost mast section outwardly to a deployed position when the flexible element is wound on said drum, a caging means for said innermost mast section including at least a bolt on said base section having cam faces and extending transversely of the antenna mast axis, and a cooperating two part latch on the innermost mast section including a yielding lost motion connection between the two parts of the latch, and said terminal member being engaged drivingly with one of said two parts to effect relative movement between the two parts during initial



winding of the flexible element on said drum, and said two parts having camming faces for cooperation with said cam faces of said bolt to automatically release the caging means during deployment of the antenna structure.

4,176,361

INK COMPOSITION FOR INK JET PRINTING

Hiroh Kawada; Kiyoshi Goto, and Yoshio Kurita, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed May 12, 1976, Ser. No. 685,629

Claims priority, application Japan, May 22, 1975, 50-61691

Int. Cl.[2] **C09D** *11/00;* **G01D** *9/00, 15/20*

U.S. Cl. 346—1.1 **4 Claims**

1. In an ink jet printing method, the improvement comprising using, as the printing ink, an ink composition consisting essentially of

a water soluble dye in an amount of 2–12 weight %, and

a mixed solvent consisting of water and 40–80% by weight of said composition of a polyhydric alcohol selected from the group consisting of ethylene glycol, propylene glycol, trimethylene glycol, glycerine, 1,3-butanediol, 2,3-butanediol, 1,4-butanediol, diethylene glycol, 1,5-pentanediol, hexylene glycol, triethylene glycol, dipropylene glycol and 1,2,6-hexanetriol,

said composition having a viscosity of 4 to 20 centipoises at 25° C.

4,176,362

HIGH DENSITY MAGNETIC IMAGE RECORDING HEAD

Alfred M. Nelson, Redondo Beach, Calif., assignor to AM International, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 594,583, Jul. 10, 1975, Pat. No. 4,025,927. This application Jan. 10, 1977, Ser. No. 758,018

Int. Cl.[2] **G03G** *19/00;* **G06K** *15/14;* **G01D** *15/12*

U.S. Cl. 346—74.1 **10 Claims**

1. A recording apparatus comprising:

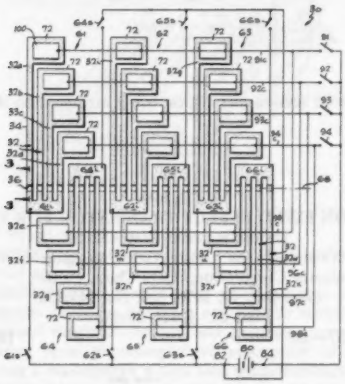
a plurality of recorder elements having substantially parallel strip portions, each strip portion having a recording location therealong, said recording locations arranged a selected distance from each other substantially along an imaginary recording line which extends substantially perpendicular to said strip portions, a plurality of said recorder elements arranged in a group and a plurality of groups spaced along said recording line with the elements

in each group having a common interconnect region on a first side of said recording line and with each element of the group having a separate terminal on a second side of said recording line;

a plurality of cross conductors, each coupled to a selected terminal within each group of elements;

a plurality of common region switch means, each coupled to a different one of said common interconnect regions; and

a plurality of cross conductor switch means, each coupled to a different one of said cross conductors;



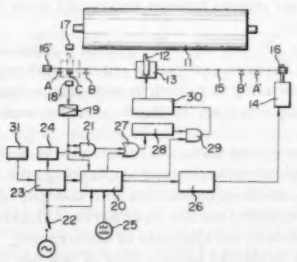
the common region switch means and the cross conductor switch means being disposed such that a source of electricity may be connected between said common region switch means and said cross conductor switch means to apply a current through one of said recorder elements when the particular common region switch means and cross conductor switch means which are both coupled to that recorder element are simultaneously in a closed state.

4,176,363

INK JET PRINTING APPARATUS

Tadashi Kasahara, Tokyo, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jun. 14, 1978, Ser. No. 915,550
Claims priority, application Japan, Jun. 25, 1977, 52-74948
Int. Cl.[2] G01D *15/18*
U.S. Cl. 346—140 R **7 Claims**



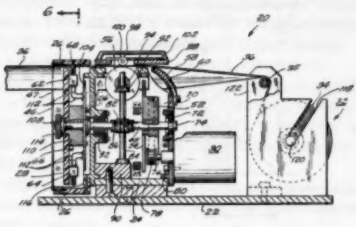
1. In an ink jet printing apparatus wherein a printing head having a plurality of parallel nozzles is moved relatively to a recording medium, and ink droplets are projected selectively from the individual nozzles for printing: the improvement characterized in that the printing head is able to be shifted to an ink-failure preventive ejection position located at a point deviated from the printing region of the recording medium, and a timer for generating a timing signal and a detector for detecting the setting of the printing head at the ink-failure preventive jet position are provided, wherein a print controller for controlling both the relative motion of the printing head to the recording medium and the selective ink ejection from the nozzles in response to print instruction signals is further enabled to control the displacement of the printing head to the ink-failure preventive ejection position in accordance with the timing signal of the timer, also the ink-failure preventive ejection from each nozzle in accordance with the output signal of the detector, and subsequent return of the printing head to the former position to resume the printing.

4,176,364

GROUNDING DEVICE FOR ROTARY ELECTRICAL PRINTER AND METHOD

Olin B. King, Huntsville, Ala., assignor to SCI Systems, Inc., Huntsville, Ala.

Division of Ser. No. 611,785, Sep. 9, 1975, Pat. No. 4,100,551. This application Mar. 22, 1978, Ser. No. 888,966
Int. Cl.[2] G01D *15/08*
U.S. Cl. 346—162 **3 Claims**



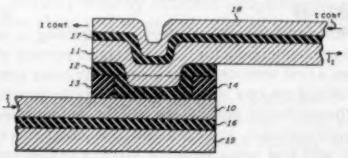
1. In a rotary electrical discharge printer having a rotor, a plurality of styli projecting from said rotor, a voltage supply connected at one terminal to said styli, means for moving electrical discharge-sensitive sheet recording material across said rotor in contact with said styli, an electrical contact brush for said material comprising an electrically conductive helical spring positioned on the same side of said material as said styli and extending transversely of the direction of recording material movement to contact and press against said material, and means for connecting said spring to the return terminal of said voltage supply.

4,176,365

JOSEPHSON TUNNEL JUNCTION DEVICE WITH HYDROGENATED AMORPHOUS SILICON, GERMANIUM OR SILICON-GERMANIUM ALLOY TUNNELING BARRIER

Harry Kroger, Sudbury, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed May 8, 1978, Ser. No. 904,051
Int. Cl.[2] H01L *39/22*
U.S. Cl. 357—5 **17 Claims**



1. A Josephson tunnel junction device comprising

first and second layers of superconductive material superposed with respect to each other, and

a barrier layer superposed between said first and second superconductive layers whereby Josephson tunneling

current can flow therethrough between said superconductive layers,

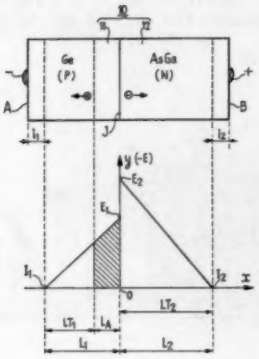
said barrier layer comprised of hydrogenated amorphous semiconductor material selected from the group consisting of silicon, germanium and alloys thereof.

4,176,366

AVALANCHE TRANSIT TIME DIODE WITH HETEROJUNCTION STRUCTURE

Daniel Delagebeaudeuf, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Jan. 24, 1978, Ser. No. 871,881
Claims priority, application France, Jan. 28, 1977, 77 02454
Int. Cl.[2] H01L *29/267, 29/90;* **H03B** *9/12*
U.S. Cl. 357—16 **4 Claims**



1. An avalanche transit time diode with heterojunction structure comprising a first zone made of monocrystalline germanium doped in one type of conductivity and a second zone made of gallium arsenide doped in the opposite type of conductivity, the impurity concentrations in atoms per cubic centimeter K_1 and K_2 of the respective first and second zones being bound by the relationship:

$$K_2 > 6.3 \times 10^{-6} (K_1)^{1.3},$$

where

$$K_2 \geqq K_1$$

with the result that the avalanche zone is located in the first zone.

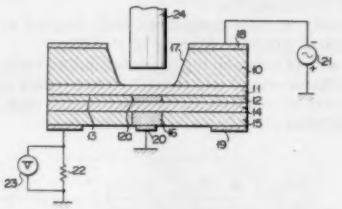
4,176,367

SEMICONDUCTOR OPTICAL DEVICE

Yutaka Uematsu, Yokosuka, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Mar. 10, 1978, Ser. No. 885,128
Claims priority, application Japan, Mar. 24, 1977, 52-31034
Int. Cl.[2] H01L *31/12, 33/00*
U.S. Cl. 357—19 **6 Claims**

1. A semiconductor optical device comprising a one-conductivity type semiconductor body through a portion of which light passes; a first semiconductor layer of the other conductivity type formed on one surface of the body to provide a pn junction therebetween and having a light emission section; a second semiconductor layer of said one conductivity type formed on said first semiconductor layer; a region formed in said second semiconductor layer to form a pn junction therebetween and having one end electrically connected to said first semiconductor layer and the other end exposed, said pn junction having a photoelectric conversion function; a first electrode formed on said body to permit a signal entry; a second electrode formed on said second semiconductor layer to permit the signal to be taken therefrom; and a third electrode formed on said region, said portion of the semiconductor body,



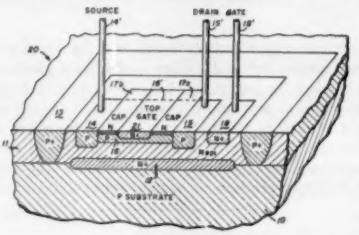
light emission section and region being arranged on the same line.

4,176,368

JUNCTION FIELD EFFECT TRANSISTOR FOR USE IN INTEGRATED CIRCUITS

James B. Compton, Los Gatos, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 10, 1978, Ser. No. 949,831
Int. Cl.[2] H01L *29/80*
U.S. Cl. 357—22 **10 Claims**



1. A junction field effect transistor for incorporation into a bipolar semiconductor integrated circuit substrate, said transistor comprising:

a gate region of one conductivity type into which said transistor is to be fabricated;

a pair of spaced apart regions of the opposite conductivity type extending into said gate region from the surface thereof, said spaced apart regions forming source and drain electrodes in said transistor;

a subsurface channel of said opposite conductivity type extending between said pair of spaced apart regions, said channel extending to a depth in said semiconductor that is substantially less than the depth of said spaced apart regions;

a first ion implanted surface layer of said one conductivity type completely covering and overlapping said channel so as to form an ohmic connection with said gate region, said first ion implanted surface layer having a thickness that is small relative to the thickness of said channel;

a second ion implanted surface layer of said one conductivity type located in the space between said spaced apart regions and extending to completely span said channel thereby to make an ohmic connection to said gate region, said second ion implanted surface layer having a substantially greater conductivity and extending below said surface to a greater extent than said first ion implanted surface layer; and

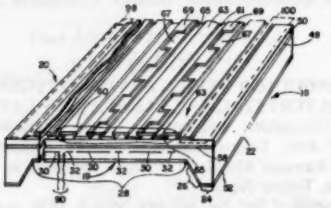
ohmic connections to said pair of spaced apart regions and said gate region to complete said source, drain, and gate electrodes.

4,176,369

IMAGE SENSOR HAVING IMPROVED MOVING TARGET DISCERNMENT CAPABILITIES

Richard D. Nelson, Santa Ana, and A. James Hughes, Tustin, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 5, 1977, Ser. No. 857,633
Int. Cl.[2] H01L *29/78, 31/00*
U.S. Cl. 357—24 **7 Claims**



1. An image sensor comprising:

semiconductor means capable of supporting charge transfer device action;

said semiconductor means being photosensitive to electromagnetic radiation having a wavelength within a predetermined range of interest and photogenerating charge carriers upon photoresponsive absorption of a photon having a wavelength within said predetermined range;

said semiconductor means having front and back surfaces;

said back surface adapted to receive image information in the form of electromagnetic radiation having wavelengths within said predetermined range;

a plurality of buried charge collection means for collecting and temporarily storing photogenerated charge carriers; and

at least two line array charge transfer device means disposed along said front surface of said semiconductive means, wherein each of said at least two line array charge transfer devices means is capable of receiving photogenerated charge selectively and controllably transferred directly thereto from a selected one of said buried charge collection means, said charge transfer device means comprising:

dielectric means disposed on said front surface of said semiconductor means;

a first plurality of charge transfer device control electrode means constituting a first multiphase set disposed on said dielectric means for controlling the transport of charge in a first one of said at least two charge transfer device means;

a second plurality of charge transfer device control electrode means constituting a second multiphase set disposed on said dielectric means for controlling the transport of charge in a second one of said at least two charge transfer device means;

a plurality of charge transfer channel separation means dividing the portion of said semiconductor means in the vicinity of said front surface into at least first and second charge transfer channels, wherein the transport of charge in said first charge transfer channel is controlled by said first plurality of control electrode means and wherein the transport of charge in said second charge transfer channel is controlled by said second plurality of control electrode means;

wherein said first and said second charge transfer channels are each capable of receiving photogenerated charge selectively and controllably transferred thereto from said selected one of said buried charge collection means;

wherein a selected one of said first plurality of charge transfer device control electrode means is capable of transferring a first packet of photogenerated charge from said selected one of said buried charge collection means into said first charge transfer channel;

wherein a selected one of said second plurality of charge transfer device control electrode means is capable of transferring a second packet of photogenerated charge from said selected one of said buried charge collection means into said second charge transfer channel;

wherein said first packet of photogenerated charge may be collected in said selected one of said buried charge collection means over a first time interval distinct from a second time interval in which said second packet of photogenerated charge is collected in said selected one of said buried charge collection means; and

output means for converting charge transported within said charge transfer channels to externally utilizable signals;

wherein said charge collection means is disposed a predetermined distance from said front surface of said semiconductor means, said predetermined distance being large enough to minimize undesired charge communication between charge on said charge collection means and charge in said charge transfer device means and small enough to enable photogenerated charge carriers collected by said charge collection means to be controllably transported from said charge collection means to said charge transfer device means for transportation from said charge collection means to said output means.

6. A charge transfer device array comprising:

a plurality of array charge transfer channels aligned parallel to a first direction, said array channels separated by first channel stop means, said plurality comprising a first plurality of array channels interleaved with at least a second plurality of array channels;

a multiphase set of array CTD charge transfer control electrodes disposed for controlling the potentials within said array channels,

wherein said plurality of array charge transfer channels and said multiphase set of array CTD charge transfer control electrodes constitute a plurality of array charge transfer devices;

wherein control electrodes of at least one phase of said set of array CTD charge transfer control electrodes constitute at least two subsets of electrodes interdigitated with each other, a first subset of electrodes controlling the potential within the portions of said first plurality of array channels thereunder and a second subset of electrodes controlling the potential within the portions of said second plurality of array channels thereunder;

at least first and second output charge transfer devices, each having an output channel aligned substantially parallel to a second direction which is substantially perpendicular to said first direction;

said first output CTD adapted to accept charge from said first plurality of array channels;

said second output CTD adapted to accept charge from said second plurality of array channels;

wherein said plurality of array channels are free of channel stops therein; and

wherein said first subset of electrodes are capable of selectively controlling the potential within said first plurality of array channels to selectively transfer charge along said first plurality of array channels independently of charge transfer along said second plurality of array channels.

4,176,370

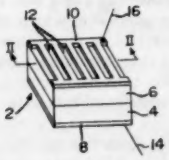
PHOTOVOLTAIC CONVERTER

Nobuyuki Koguchi, and Katashi Masumoto, both of Tokyo, Japan, assignors to National Research Institute for Metals, Tokyo, Japan

Filed Feb. 22, 1978, Ser. No. 880,160
Claims priority, application Japan, Feb. 24, 1977, 52-18677
Int. Cl.[2] H01L *27/14*
U.S. Cl. 357—30 **3 Claims**

1. Photovoltaic converter comprising a main unit consisting of a p-n heterojunction of a p- or n-type magnetic semiconductor MCr_2X_4 in which M represents any one of Zn, Cd and Hg

and X represents any one of O, S, Se and Te and an n- or p-type semiconductor $M'In_2S_4$ in which M' represents anyone of Zn, Cd and Hg and which has an optical absorption edge at a shorter wavelength than the optical absorption edge of the



semiconductor MCr_2X_4; a first electrode ohmically fixed to the surface of the semiconductor MCr_2X_4; and a second electrode fixed ohmically to the surface of the semiconductor $M'In_2S_4$ and allowing light to reach the surface of the semiconductor $M'In_2S_4$.

4,176,371

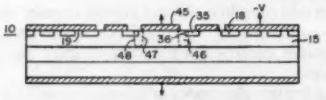
THYRISTOR FIRED BY OVERVOLTAGE

Earl S. Schlegel, Plum Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 647,824, Jan. 9, 1976, abandoned. This application Nov. 3, 1977, Ser. No. 848,007

Int. Cl.[2] H01L *29/74*

U.S. Cl. 357—38 **7 Claims**



1. A thyristor adapted to fire in response to a predetermined forward overvoltage, comprising:

a body of semiconductor material having first and second outer surfaces with four impurity regions of alternative type conductivity disposed in PN junction relationship;

said regions being a cathode emitter region and a cathode base region, each having surfaces forming a portion of the first outer surface of the body, an anode base region and an anode emitter region, said anode emitter region having a surface forming at least a portion of the second outer surface of the body;

said cathode emitter region including an inner auxiliary portion and an outer main portion, said auxiliary portion being disposed to form the central portion of the first outer surface and having an outer boundary of predetermined dimension, and said main portion being radially spaced from the inner portion with at least a portion of the cathode base region forming the first outer surface of the body between the auxiliary and main cathode emitter regions;

an extra diffused impurity region of the same conductivity type as the cathode base region disposed in the cathode base region centrally of the outer boundary of the auxiliary cathode emitter region portion extending from the first outer surface to within five (5) microns of the PN junction formed by the cathode and anode base regions;

said extra impurity region having a higher impurity density gradient adjacent the PN junction formed by the cathode and anode base regions than the density gradient of the PN junction radially adjacent to said extra region under said auxiliary portion of the cathode emitter region, and under the outer main portion of the thyristor;

a metallic electrode in ohmic contact with the first outer surface disposed overlying the PN junction formed at the outer boundary of the auxiliary cathode emitter region and the cathode base region;

a metallic cathode electrode in ohmic contact with the first outer surface formed by the main cathode emitter region portion; and

a metallic anode electrode in ohmic contact with the second outer surface formed by the anode emitter region, whereby a predetermined overvoltage applied to the anode electrode causes the device to avalanche initially in the area of the said extra region of the cathode base region.

4,176,372

SEMICONDUCTOR DEVICE HAVING OXYGEN DOPED POLYCRYSTALLINE PASSIVATION LAYER

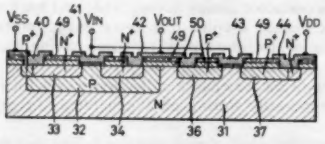
Takeshi Matsushita, Sagamihara; Hisao Hayashi, Atsugi; Teruaki Aoki, Tokyo; Hisayoshi Yamoto, Hatano, and Yoshiyuki Kawana, Atsugi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 682,449, May 3, 1976, abandoned, which is a continuation-in-part of Ser. No. 561,532, Mar. 24, 1975, Pat. No. 4,014,037. This application Dec. 5, 1977, Ser. No. 857,284

Claims priority, application Japan, Mar. 30, 1974, 49-36175; May 7, 1975, 50-54943

Int. Cl.[2] H01L *29/34*

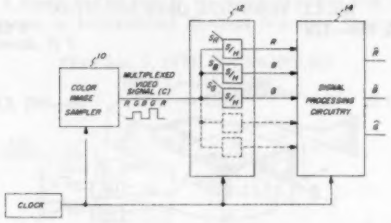
U.S. Cl. 357—52 **2 Claims**



1. An MOS inverter including an N-channel MOS-FET and a P-channel MOS-FET which comprises a monocrystalline silicon semiconductor substrate of N-type impurity having a planar face, a P-type island formed in said planar face, first and second N+ type laterally spaced regions formed in the planar face of said P-type island, first and second P+ type regions formed in the planar face of said substrate laterally spaced from said N+ type regions, a third P+ type region in said planar face of said substrate extending down to the PN junction between said P-type region and said N-type substrate which lies near the outer side edge of the substrate; a third N+ type region extending down from the planar face of said substrate into contact with said substrate, an oxygen doped polycrystalline semiconductor layer interfaced with the planar face of said substrate including said P+ and N+ regions, the oxygen content of said polycrystalline layer being between 2 and 45 atomic percent, the thickness of said polycrystalline layer over the substrate region lying between said first and second P+ regions and the thickness of said polycrystalline layer over the region of said first P-type region lying between said first and second N+ regions being substantially thinner than that lying over the remaining portions of the planar face, a layer of an insulating semiconductor material overlying the thicker portions of said polycrystalline layer, and in two regions in contact with said P-type island and said N-type substrate, a pair of gate electrodes extending down into complete surface contact with said two regions of insulating material, said gate electrodes being externally connected together, a source electrode extending through said insulating layer and said polycrystalline layer into contact with said first N+ region and said third P+ region, a drain electrode extending through said insulating layer and said polycrystalline layer into contact with said second P+ region and said third N+ region, a single contact extending through said insulating layers and said polycrystalline layers at two places into contact with said second N+ region and said first P+ region, the density of the surface states

of the interface between said polycrystalline layer and said substrate being less than 10^{10} states/(cm^2.eV) in the center of the forbidden band, the electrical property of said layer reducing the influence of an electrical field.

4,176,373
SIGNAL PROCESSING FOR DISCRETE-SAMPLE-TYPE-COLOR-VIDEO SIGNAL
Peter L. P. Dillon, Pittsford, and Bryce E. Bayer, Greece, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Jul. 6, 1977, Ser. No. 813,377
Int. Cl.[2] H04N 5/14
U.S. Cl. 358—37 **7 Claims**



1. For use with a video camera having imaging apparatus for producing a discrete-sample-type-multicolor video signal representative of elemental areas of an image for a set of primary colors, such areas being arranged based on a predefined row-by-row scanning pattern to define respective sampling frequencies and periods for such primary colors, said multicolor video signal representing discrete, periodic updates of said set of primary colors, said updates being staggered among the colors of said set, signal processing apparatus comprising:

(A) means for decoding such video signal to produce a corresponding set of discrete-sample-type-single-color-signals for the respective primary colors, which discrete-sample-type-single-color-signals represent periodic updates of respective primary colors at intervals determined by the corresponding color sampling frequency; and

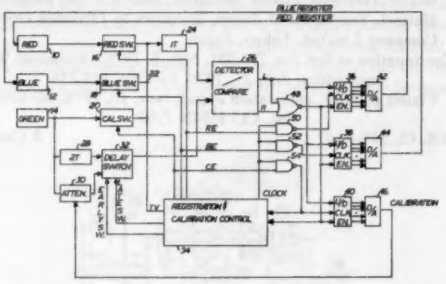
(B) interpolating means for producing generally continuous primary-color signals in accordance with said discrete-sample-type-single-color-signals, said interpolating means including

(1) respective color signal delay means for receiving the discrete-sample-type-single-color signals, said means having a time delay characteristic matched to the sampling period for the corresponding primary color, and

(2) respective integrating means cooperative with said signal delay means for producing a continuous color signal by integrating the difference between the delayed version and the relatively undelayed version of the corresponding discrete-sample-type-single-color signal.

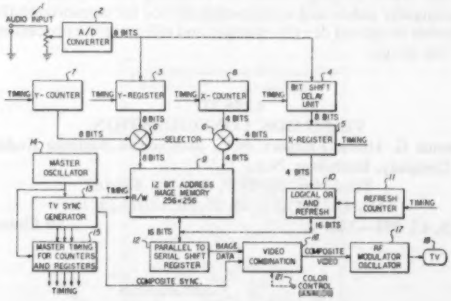
4,176,374
SENSITIVITY AND CALIBRATION CONTROL FOR TELEVISION CAMERA REGISTRATION SYSTEM
Fred M. Eames, Quincy, Ill., assignor to Harris Corporation, Cleveland, Ohio
Filed Apr. 22, 1977, Ser. No. 790,033
Int. Cl.[2] H04N 9/16
U.S. Cl. 358—51 **4 Claims**

1. Sensitivity control apparatus for use in an automatic registration system which cyclically registers at least two video signals by in each operating cycle deriving a misregistration signal indicative of misregistration between the two signals and, at the conclusion of each cycle, changing a registration control signal in accordance with said misregistration signal, said apparatus comprising means for, in each operating cycle, determining the reliablity of the misregistration signal derived during that operating cycle, and means for preventing said misregistration signal from changing said registration control



signal at the conclusion of operating cycles in which said misregistration signal is determined to be unreliable.

4,176,375
APPARATUS FOR VIDEO DISPLAY OF AUDIO FREQUENCY PATTERNS
Jonathan B. Scarpelli, 11714 Montbrook, Houston, Tex. 77099
Filed Jun. 30, 1978, Ser. No. 920,705
Int. Cl.[2] H04N 7/18
U.S. Cl. 358—92 **15 Claims**



1. Apparatus for connection to the antenna input connections to a television receiver comprising,

input connections adapted for construction to an audio signal to receive said signal in analog form,

output connections adapted for connection to the antenna input connections to a television receiver,

means to convert an input signal from analog to digital form,

circuit means to supply the digital form signal to said output connections for display on a video tube, and

circuit means to vary the relationship of the x- and y-components of the signal received through said input connections whereby said digital form signal supplied to said output connections will produce on a video tube a pattern of predetermined form varying in size and shape in accordance with the audio input signal.

4,176,376
IMAGE PROCESSING SYSTEM

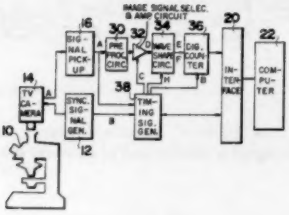
Shinichi Kamachi, Hino; Masao Izawa, Hachioji; Nagahiro Gocho, Hachioji; Yoshio Nakajima, Hachioji, and Shinichiro Hattori, Tokyo, all of Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan

Continuation of Ser. No. 739,051, Nov. 5, 1976, abandoned. This application Jun. 27, 1978, Ser. No. 919,716

Claims priority, application Japan, Nov. 10, 1975, 50/134837

Int. Cl.[2] H04N *7/02*

U.S. Cl. 358—107 **5 Claims**



1. An image processing system, comprising a microscope for observing a sample, a television camera optically coupled to the microscope for converting the microscope image of the sample into electric image signals, an image signal pickup device connected to the camera for extracting a required part of the image signals, a synchronizing signal generator connected to the camera and to said pickup device for generating synchronizing signals for the image signal pickup device, a preprocessing circuit connected to the image signal pickup device for extracting and differentiating a frequency component of the image signal and detecting the number of optical density changes, an image signal selection and amplifying circuit connected to the preprocessing circuit for selecting and amplifying the component of the image signal, a wave shaping circuit connected to the image signal selection and amplifying circuit for quantizing the image information component to obtain a train of rectangular pulses, a digital counter connected to the wave shaping circuit for counting the number of the rectangular pulses and a computing device for memorizing the number of optical density changes and effecting the processing of the image.

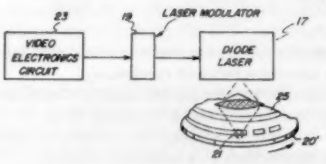
4,176,377
VIDEO DISC CONFIGURATION

Dennis G. Howe, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 10, 1977, Ser. No. 850,162

Int. Cl.[2] G11B *7/26, 25/10;* **G01D** *15/10*

U.S. Cl. 358—128 **10 Claims**



5. In a video record device having a recording sensitive surface comprised of a thermal recording material in which video information can be recorded by exposure to a recording beam focussed to a record spot of predetermined width, said record spot having an irradiance distribution that decreases in intensity away from its center portion, the improvement wherein:

said surface is sensitive to recording along adjacent record tracks and non-sensitive to recording in the region between adjacent record tracks, and wherein the center of one record track and the nearest edge of an adjacent record track are spaced apart a distance less than one-half the width of the record spot.

4,176,378
SIGNAL PICKUP ARM LIFTING/LOWERING AND GROOVE SKIPPER APPARATUS

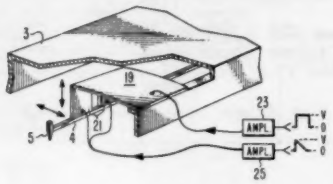
Minoru Toda; Susumu Osaka, both of Machida, and Yasushi Matsumoto, Narashino, all of Japan, assignors to RCA Corporation, New York, N.Y.

Filed Apr. 13, 1978, Ser. No. 895,972

Claims priority, application United Kingdom, Apr. 19, 1977, 16280/77

Int. Cl.[2] H04N *5/76;* **G11B** *3/38, 17/00*

U.S. Cl. 358—128 **5 Claims**



3. A pickup apparatus for use with a disc record having a spiral information track disposed on the surface thereof; said apparatus comprising:

(A) a cartridge body subject to radial translation toward the center of said record during playback;

(B) a pickup arm;

(C) a compliant support member for pivotally securing one end of said pickup arm to said cartridge body;

(D) a signal pickup secured to the other end of said pickup arm; and

(E) transducer means interposed between said other end of said pickup arm and said cartridge body for selectively effecting motion of said other end of said pickup arm toward-and-away from the plane of said record and toward-and-away from said record center upon energization thereof.

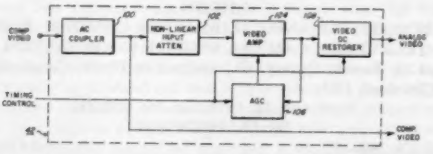
4,176,379
VIDEO INPUT CIRCUITS FOR VIDEO HARD COPY CONTROLLER

Louis E. Wessler, Cupertino, and Kenneth F. Koch, Mountain View, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 17, 1977, Ser. No. 843,006

Int. Cl.[2] H04N *1/40, 5/52*

U.S. Cl. 358—280 **8 Claims**



4. A d-c restorer circuit for use with a video amplifier of the type adapted to amplify a composite video signal comprised of a video data component and a synchronization component, said circuit comprising:

first means coupled to the output of said video amplifier for sampling the voltage level of the amplified composite

video signal during a predetermined portion of said synchronization component;

second means coupled to said first means for deriving from said sampled predetermined portion a d-c control voltage; and

third means for summing said d-c control voltage with the amplified composite video signal at the output of said video amplifier whereby said predetermined portion of said synchronization component is maintained in a predetermined relationship relative to a predetermined reference potential.

4,176,380

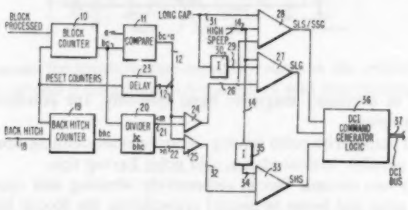
ADAPTIVE SPEED/INTERBLOCK GAP CONTROL FOR TAPE DRIVE

John A. Koski, and Richard B. Weaver, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 9, 1978, Ser. No. 868,005

Int. Cl.[2] G11B *5/09*

U.S. Cl. 360—50 **10 Claims**



1. Apparatus for varying lineal speed of a magnetic tape in a tape transport system adaptively as necessary best to suit the operational mode or availability of a host system, said apparatus comprising:

means normally operative to advance the tape at one speed for processing blocks of digital data continuously, but operative during advancement of the tape at said one speed to provide a backhitch signal in response to a condition requiring a backhitch operation;

means including means responsive to a preselected occurrence rate of said backhitch signals for causing the tape to be advanced at a preselected lower speed less than said one speed, thereby to minimize the likelihood of further backhitches; and

means operative during writing of data on the tape to increase the gaps between adjacent blocks of such data from a normal length to a longer length in response to a predetermined occurrence rate of said backhitch signals.

4,176,381

RECORDING AND/OR REPRODUCING APPARATUS FOR A MAGNETIC RECORD CARRIER IN THE FORM OF A TAPE, PROVIDED WITH A CONTROL SYSTEM FOR THE MAGNETIC HEAD POSITION

Edmond de Niet, and Albert M. A. Rijckaert, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

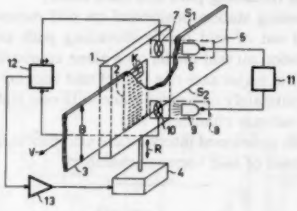
Filed Oct. 16, 1978, Ser. No. 951,688

Claims priority, application Netherlands, Nov. 11, 1977, 7712418

Int. Cl.[2] G11B *21/10*

U.S. Cl. 360—77 **7 Claims**

1. Apparatus for recording and/or reproducing information in a plurality of parallel tracks on a magnetic record carrier in the form of a tape, which apparatus comprises a magnetic head which is adapted to cooperate with the record carrier which is passed along this magnetic head, positioning means for controlling the relative position of the magnetic head with respect to the record carrier in a direction transverse to the direction of transport of the record carrier and in a plane parallel to the plane of the record carrier, and control means for generating and applying to the positioning means a control signal which is representative of the difference between the instantaneous and the desired position of the magnetic head, characterized in that the control means are provided with a first and a second optical system, each comprising a light-emitting element for emitting a radiation beam against an individual edge of the record carrier and a light-receiving element for receiving the amount



of light from the radiation beam emitted by the associated light-emitting element which shines past the record carrier, at least one of the said two elements of each optical system being rigidly connected to the magnetic head, and the control means furthermore being provided with a detection device which is coupled to the light-receiving elements of the two optical systems for generating the control signal for the positioning means in dependence on the relative magnitude of the amounts of light received by the two light-receiving elements.

4,176,382

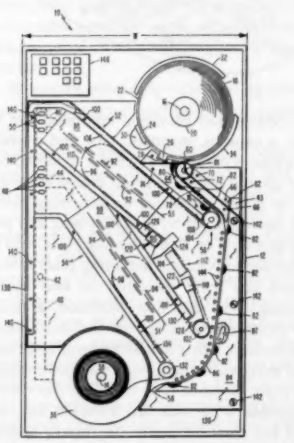
HIGH PERFORMANCE TAPE PATH FOR A 19 INCH TAPE RECORDER

Frederick B. Froehlich; Roy Hennings, both of Boulder, and William J. Schaffer, Loveland, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 22, 1978, Ser. No. 908,491

Int. Cl.[2] G11B *15/58, 15/66*

U.S. Cl. 360—95 **4 Claims**



1. Transport for positioning a flexible media comprising in combination:

a mounting frame;

a rotatable file reel having a first axis of rotation operably mounted on said mounting frame;

a rotatable machine reel having a second axis of rotation, mounted so that the first axis of rotation and the second

axis of rotation for the file reel and the machine reel are being positioned on a diagonal line;

a vertical channel positioned so as to define a media threading path between the file reel and the machine reel;

a pair of vacuum chambers having a closed end and an opened end with the opened end positioned adjacent to the media threading path and a pair of major axes running between the closed end of each vacuum chamber whereby the axes are inclined at different angles with respect to the media threading path and each other;

a processing station positioned on said mounting frame located out of said media threading path and located for operation on said media on a plane approximately parallel to a first major axes of a first of said vacuum chambers and approximately on a same plane with one wall of the first of said vacuum chambers; and

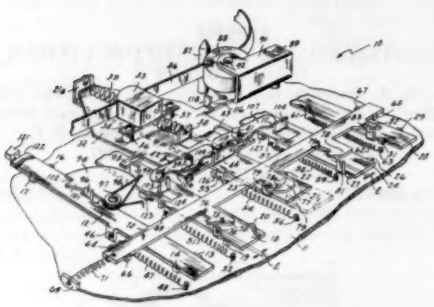
a capstan positioned intermediate said processing station and a second of said vacuum chambers.

4,176,383

TAPE MACHINE HAVING AUTOMATIC RETURN TO PLAYBACK MODE AFTER FAST FORWARD OR REWIND

Nobuo Suzuki, Sagamihara, Japan, assignor to Technical Incorporated, Japan

Continuation-in-part of Ser. No. 665,386, Mar. 10, 1976, abandoned. This application Mar. 10, 1978, Ser. No. 885,276
Claims priority, application Japan, May 29, 1975, 50-65040
Int. Cl.[2] G11B *21/22, 5/54*
U.S. Cl. 360—105 **10 Claims**



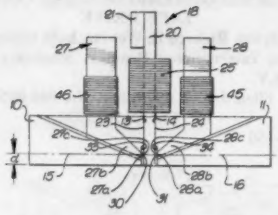
1. A recording and playback tape machine having a magnetic head, a capstan, magnetic tape and a pinch roller comprising, a frame, a playback key lever mounted for limited slide movement on said frame and first means biasing said playback key lever in a first direction, an actuating plate mounted on said frame and engaged by said playback key lever, said magnetic head mounted on said actuating plate, said playback lever when depressed moves said actuating plate toward said tape, a fast forward key lever mounted on said frame and second means biasing it in said first direction, a rewind key lever moveably mounted on said frame and third means biasing it in said first direction, a first actuating lever attached to said frame for pivotal movement and having one end engageable with said actuating plate to move it in said first direction and a second end engageable with said fast forward key lever such that when said fast forward key is depressed, said actuating plate will be moved in said first direction to move said head away from said tape when said playback lever has been depressed and a second actuating lever attached to said frame for pivotal movement relative thereto and having one e . which is engageable with said actuating plate to move it in said first direction and having a second end which is engageable with said rewind key lever such that when said rewind key lever is depressed said actuating plate will be moved in said first direction to move said head away from said tape when said playback lever has been depressed.

4,176,384

MAGNETIC RECORDING HEAD ASSEMBLY DEFINING PRECISION GAPS

Charles S. Yang, Santa Barbara, Calif., assignor to Yang Electromagnetics Systems Inc., Ventura, Calif.

Filed May 15, 1978, Ser. No. 905,734
Int. Cl.[2] G11B *5/27, 5/42*
U.S. Cl. 360—121 **6 Claims**



1. In a unitary magnetic head assembly, the combination comprising

(a) read/write poles having opposite sides defining upright, parallel vertical planes, said poles having tips,

(b) two ceramic blocks respectively abutting said opposite sides and being in mutual registration, the blocks having local recesses therein extending laterally away from said upright opposite sides and the blocks having upright inner surfaces adjacent said recesses and respectively facing laterally toward said opposite sides,

(c) and two erase poles respectively carried by said blocks, said erase poles having inner surfaces flush with the respective block inner surfaces thereby to define gaps between the erase pole inner surfaces and the read/write pole opposite sides, whereby the gap widths are defined by the widths of the recesses in the blocks,

(d) the blocks having bottom slide surfaces, the erase poles having ends flush with said slide surfaces, and the read/write poles having tips flush with said slide surfaces.

4,176,385

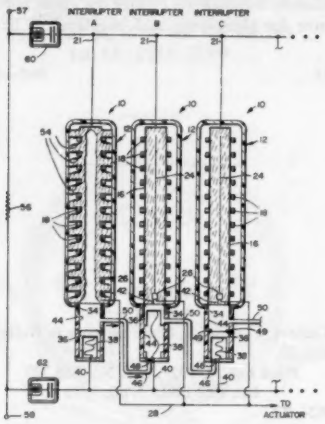
EXPLOSIVELY ACTIVATED FAULT CURRENT LIMITER

Rolf Dethlefsen, Greensburg, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Apr. 24, 1978, Ser. No. 899,539
Int. Cl.[2] H02H *7/22*
U.S. Cl. 361—58 **23 Claims**

1. An explosively activated current interrupter for use in a system employing a plurality of said interrupters activated in a predetermined sequence of said interrupters to control a succession of power line faults, said interrupter comprising: a housing, a conductive member in said housing for conducting current carried by said power line, switch means in said housing for interconnecting said conductive member with said power line, said switch means having a closed position in which said switch means electrically connects said conductive member with said power line and an open position electrically disconnecting said conductive member from said power line, insertion means for closing said switch means a predetermined time after actuation of said insertion means, explosive means in said housing for breaking said conductive member into a plurality of separated portions upon detonation to interrupt said

current carried by said power line and for opening said switch means, and means responsive to the detonation of said explo-

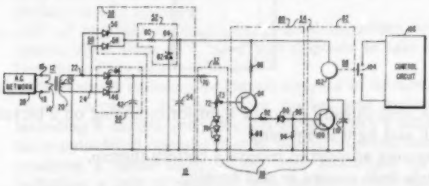


sive means for actuating said insertion means in the next interrupter of said predetermined sequence of said interrupters.

4,176,386
OVERCURRENT RELAY

Kung C. Chow, East Hanover, N.J., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 19, 1978, Ser. No. 907,522
Int. Cl.[2] H02H *3/08*
U.S. Cl. 361—93 9 Claims



1. An overcurrent relay, comprising:

a current transformer having a primary winding adapted for energization by an alternating current, and a secondary winding,

detector means including a first portion which requires an information signal, and a second portion which requires a power supply,

first means connecting said secondary winding to the first portion of said detector means, to provide said information signal,

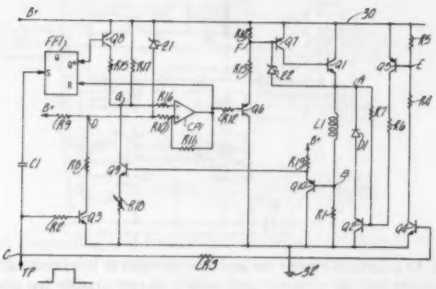
and second means connecting said secondary winding to the second portion of said detector means, to provide said power supply,

said second means including non-linear means which, along with the second portion of said detector means, co-operate to provide a constant impedance load on said current transformer, to enable said current transformer to simultaneously supply operating power, and an information signal which varies linearly with the alternating current flowing in said primary winding.

4,176,387
INDUCTIVE DRIVE CIRCUIT FOR SETTING THREE DIFFERENT LEVELS OF LOAD CURRENT INCLUDING A DOWNSHIFT DELAY

Patrick D. Harper, Seaford, Va., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 27, 1978, Ser. No. 881,327
Int. Cl.[2] H01H *47/32*
U.S. Cl. 361—154 5 Claims



1. A current control circuit, enabled by a load actuation signal, comprising switch means operable to actuate an inductive load by normally increasing the current therethrough above a first level of load current and operable thereafter to alternately connect and disconnect a power supply to said load to maintain load actuation with holding current ranging between second and third levels of current, wherein said second and third levels of current are downshifted from and less than said first level, said control circuit further including:

(a) load current sense means, comprising a sense impedance in series with said inductive load, for generating a sense signal representative of the current drawn through said inductive load;

(b) reference means for providing reference signals representative of said first, second and said third current levels, respectively;

(c) comparator means, having a sense input coupled to said sense means, a reference input coupled to said reference means, and an output coupled to said switch means, for comparing said sense signal and said reference signal and for generating a first comparator output level causing said switch means to disconnect said power supply and a second comparator output level causing said switch means to connect said power supply, said first output level being generated after the beginning of said actuation signal when initially said comparison indicates the current through said inductive load exceeds said first current level and thereafter until the end of said actuation signal when said comparison indicates the current through said inductive load exceeds said second current level, said second output level being generated when said comparison indicates the current through said inductive load is less than said third current level; and

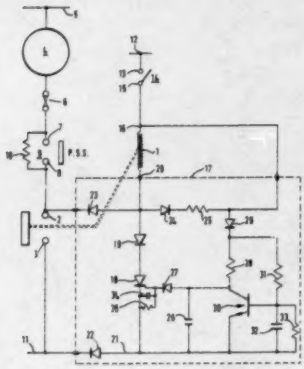
(d) time delay means for delaying the downshift of said load current from said first level to the range between said second and third levels when said load current increases to said first level at a rate too fast to actuate said inductive load.

4,176,388

CONTROL CIRCUIT FOR A CONTACTOR

Norman H. G. Palmer, Glenfield, England, assignor to Towmotor Corporation, Mentor, Ohio

Filed Mar. 30, 1978, Ser. No. 891,586
Int. Cl.[2] H01H *47/18, 47/32*
U.S. Cl. 361—196 **11 Claims**



1. In a control circuit for a contactor with at least one pair of contacts and an actuator coil which is energizable by direct current under the control of a switch to cause closure of the contacts, the improvement comprising:

switching means coupled in series with the actuator coil and in parallel with the contacts;

first timing means for operating the switching means and energizing the actuator coil a preselected time after closure of the switch and controllably coupling the actuator coil in series with the contacts; and

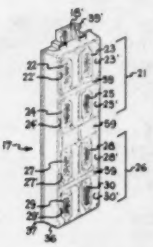
second timing means for preventing a second operation of the switching means until after further predetermined period of time.

4,176,389

PHOTOFLASH UNIT WITH TWO-COLOR INDICATOR

William J. Harvey, Trout Run, Pa.; Thomas B. McDonough, San Jose, Calif., and John W. Shaffer, Williamsport, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Oct. 25, 1977, Ser. No. 844,872
Int. Cl.[2] G03B *15/02*
U.S. Cl. 362—5 **11 Claims**



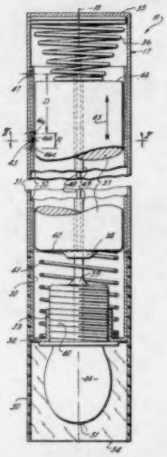
1. A photoflash unit comprising: a closed container having a plurality of sides; a plurality of flashlamps disposed in said container; and at least one flashed lamp indicator located adjacent to a side of said container in radiant-energy-receiving relationship with one of said flashlamps, said indicator comprising, a first layer of film having a first color and composed of a heat-shrinkable material, and a second layer of film juxtaposed with said first layer of film and having a second color, said second layer of film being translucent and composed of a non-shrinkable material which is substantially unaffected by the heat of lamp flashing; whereby upon the flashing of said one of said lamps, the radiant energy therefrom causes said first layer of film to shrink away from an area of said second layer of film to thereby significantly change the visual appearance of said indicator for identifying said one lamp as having been flashed.

4,176,390

LIGHT

David R. Galbert, Cincinnati, Ohio, assignor to Galbert-French, Inc., Lisle, Ill.

Filed Feb. 4, 1977, Ser. No. 765,727
Int. Cl.[2] B62J *5/00, 5/16*
U.S. Cl. 362—72 **17 Claims**



1. A centrifugally operable light for mounting on a bicycle wheel, said light comprising

a housing adapted to receive a battery therein,

a light bulb carried in said housing,

a centrifugally operable switch connecting said battery and said bulb, said switch being movable from an off position at which said light bulb is not lighted to an on position at which said light bulb is lighted in response to centrifugal force generated by rotation of said wheel, and said switch being movable from said on position back to said off position in response to the lack of centrifugal force when rotation of said wheel is stopped,

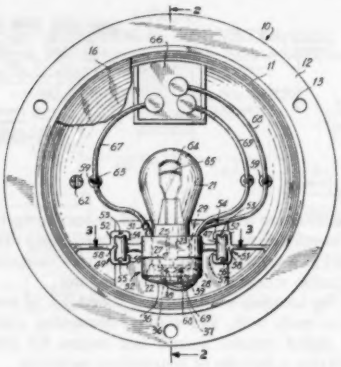
a manually operable activator connected in operable relation with said centrifugally operable switch, said activator structure permitting selection by a user of one of (a) an active attitude for said light in which said centrifugally operable switch is rendered operative to turn said lgiht bulb on and off in response to centrifugal force generated by rotation of said wheel or the lack thereof, and (b) an inactive attitude for said light in which said centrifugally operable switch is rendered inoperative to prevent turning said light bulb on in response to centrifugal force generated by rotation of said wheel, and

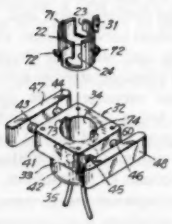
a connector adapted to connect said light to said wheel.

4,176,391
SHOCK ISOLATING LAMP ASSEMBLY

George J. Kulik, Valley Stream, N.Y.; Michael C. Meslink, Ramsey, and James P. Mulder, Oakland, both of N.J., assignors to Abex Corporation, New York, N.Y.

Filed May 26, 1978, Ser. No. 910,155
Int. Cl.[2] F21V 15/04
U.S. Cl. 362—390 11 Claims





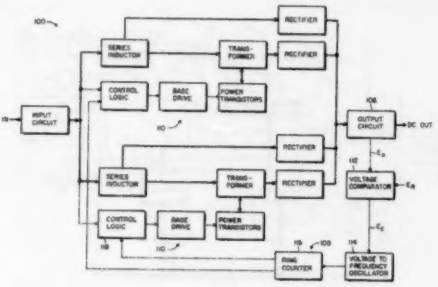
1. A shock isolating vehicle lamp assembly comprising:
a lamp housing defining a lamp cavity and a lens forming a surface of said assembly;
a pair of opposed substantially parallel mounting tracks spaced apart from each other and disposed in said lamp housing within said cavity; and
a resilient shock isolating moldment adapted to be mounted on and between said mounting tracks, said moldment including a central body portion formed with a substantially cylindrical opening therein having a central axis for retaining a metal lamp socket, said moldment further including a pair of opposed arm means extending outwardly in a plane perpendicular to said central axis of said moldment, each said arm means joined to a transverse mounting bar, said mounting bars adapted to be engaged by said opposed pair of mounting tracks.

4,176,392
SERIES INDUCTION/PARALLEL INVERTER POWER STAGE AND POWER STAGING METHOD FOR DC-DC POWER CONVERTER

Donald L. Cronin, Anaheim, Calif., and John J. Biess, Canoga Park, Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 14, 1977, Ser. No. 860,366
Int. Cl.[2] H02M 7/00
U.S. Cl. 363—71 5 Claims

1. A DC-DC power converter circuit comprising: input means for receiving DC power from a DC source, output means, a plurality of parallel inverter power stages connected in parallel between said input and output means, each said parallel power stage comprising a transformer having a primary winding connected to said input means and a secondary winding, transistors forming a parallel inverter connected to said primary winding and adapted to be turned on and off alternately for converting DC power from said DC source to a fluctuating current flow in said primary winding to induce a fluctuating current in said transformer secondary winding, and pulsewidth-modulated transistor drive means for applying pulse-width-modulated driving signals to said transistors for turning said transistors on and off alternately, and rectifying

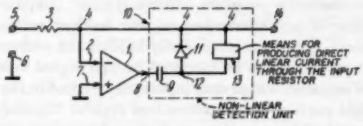


means connecting said transformer secondary winding to said output means for rectifying said fluctuating volttage to a DC voltage and delivering said DC voltage to said output means to provide a DC output voltage from said converter, and feedback means for sensing the converter circuit's output voltage and activating said pulse-width-modulated transistor drive means of said parallel power stages in a variable sequential rate generated in response to said output voltage error to effect power conduction through said parallel stages in phased relation and maintain said output voltage constant.

4,176,393
A.C. TO D.C. VOLTAGE CONVERTER

Toom A. Pungas, Sypruse bulvar, 219, kv. 3; Tynis A. Laud, ulitsa Mustamyae, 147, kv. 198; Kheino A. Reinberg, ulitsa Akademia, 60, kv. 16; Raul-Vello P. Rebane, ulitsa Mustamyae, 181, kv. 137, and Toomas R. Lumi, ultisa Komeedi, 15, kv. 3, all of Tallin, U.S.S.R.

Filed Oct. 4, 1977, Ser. No. 839,349
Int. Cl.[2] H02M 7/02
U.S. Cl. 363—125 9 Claims



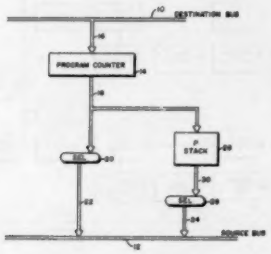
1. An a.c. to d.c. voltage converter comprising:
an a.c. voltage amplifier having an inverting input, a non-inverting input connected to ground, and an output;
an input resistor having a first lead connected to said inverting input of said a.c. voltage amplifier, and a second lead connected to a first input of said converter;
a separating capacitor having a first lead connected to said output of said a.c. voltage amplifier, and a second lead;
a diode having a first electrode connected to said first lead of said input resistor, and a second electrode connected to said second lead of said separating capacitor; and
a means for producing direct linear current through said input resistor electrically coupled to the input of said a.c. to d.c. voltage converter and placed in parallel with said diode.

4,176,394

APPARATUS FOR MAINTAINING A HISTORY OF THE MOST RECENTLY EXECUTED INSTRUCTIONS IN A DIGITAL COMPUTER

David G. Kaminski, West St. Paul; Mickiel P. Fedde, Apple Valley, and Robert C. DeWard, Burnsville, all of Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Jun. 13, 1977, Ser. No. 806,211
Int. Cl.[2] G06F *13/00*
U.S. Cl. 364—200 3 Claims



1. In a digital computer capable of executing instructions and of the type having a program address register for holding the address of the next instruction to be executed, said instructions containing a function code portion and an operand address portion and at least one of said instructions being capable of causing a branch to a program address not in succession with the last program address and containing a main memory for storing said instructions, an apparatus for maintaining a history of which of said instructions have been executed by said digital computer, comprising:

an instruction register for holding the instruction currently being executed by said digital computer and coupled to said main memory for receiving said instructions from said main memory;

decoding means coupled to a portion of said instruction register containing said function code portion for decoding the instruction type and for providing a signal of a first binary significance when the function code portion of said instruction designates a branch instruction and of the opposite binary significance when said function code portion specifies a non-branch instruction;

an incrementable program address register coupled to the portion of said instruction register holding said operand address portion for temporarily holding the address of the next instruction to be executed by said digital computer;

a set of registers whose data inputs are coupled to the output of said portion of said instruction register containing said operand address portion each of said registers capable of holding the value of the contents of said operand portion of said instructions;

an incrementable counter register whose output is coupled to said set of registers for selecting one of said set of registers based upon the value of the contents of said counter registers; and

control means coupled to the output of said decoding means and to said set of registers for causing the contents of said operand portion of said instruction register to be stored in the selected one of said set of registers upon the execution of each instruction by said digital computer and for incrementing the value of the contents of said counter register whenever said decoding means produces a signal of said first binary significance;

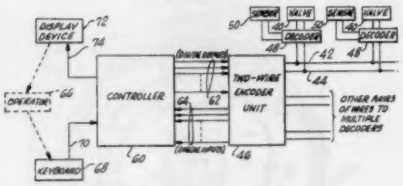
whereby a history is maintained of which of said instructions have been most recently executed.

4,176,395

INTERACTIVE IRRIGATION CONTROL SYSTEM

Rene H. Evelyn-Veere, Torrance, and Richard L. Ruggles, Mount Baldy, both of Calif., assignors to Clemar Manufacturing Corporation, Azusa, Calif.

Filed Nov. 16, 1977, Ser. No. 852,023
Int. Cl.[2] G06F *15/56;* G05B *11/00;* A01G *25/16*
U.S. Cl. 364—420 27 Claims



1. An interactive irrigation control system comprising:

digital control means for controlling a plurality of irrigation valves in accordance with a plurality of independent and repeatable schedules of instructions; and

means for creating or modifying schedules of instructions concurrently with, and without disrupting, operation of said digital control means, said means for creating or modifying schedules of instructions including

schedule storage means, for storing a plurality of schedules of instructions for control of the irrigation valves,

operator input and output means, and

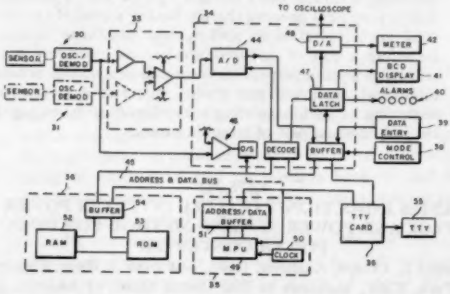
operator input/output service means, for interpreting operator instructions and deriving therefrom schedules for storage in said schedule storage means, and for initiating operator output messages, said operator input/output service means being operable simultaneously with, and without disruption of said digital control means, to provide operator communication without disturbing execution of the schedules of instructions.

4,176,396

APPARATUS FOR DIRECTLY MEASURING MACHINE TOOL WEAR

John R. Howatt, Waltham, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Sep. 23, 1977, Ser. No. 836,220
Int. Cl.[2] G01N *19/02*
U.S. Cl. 364—551 15 Claims



1. A system for determining the wear characteristics of at least one cutting tool comprising

at least one sensing means for producing an output signal representing the cutting profile characteristics of said at least one cutting tool as said tool passes adjacent thereto;

data processing means responsive to said at least one sensing means output signal for storing information concerning said cutting profile characteristics when said cutting tool

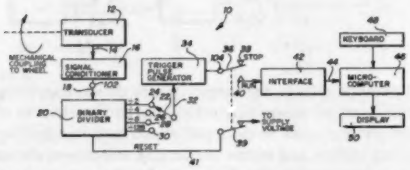
is initially installed for use and for obtaining up-dated information concerning said cutting profile characteristics during subsequent use of said cutting tool;

means for comparing said initial stored profile characteristics information with said up-dated profile characteristics information to provide output information concerning the wear characteristics of said at least one cutting tool.

4,176,397
ELECTRICAL ODOMETER

Carol L. Crom, and Elizabeth J. Crom, both of 1813 Arrow La., Garland, Tex. 75042

Filed Dec. 23, 1977, Ser. No. 863,887
Int. Cl.[2] G06F *15/20*
U.S. Cl. 364—561 **13 Claims**



1. An electrical odometer for use in a wheeled vehicle, comprising:

(a) means for generating a first series of electrical pulses which are related to a given unit of distance traveled by the vehicle;

(b) means for conditioning said first series of pulses to provide a train of shaped pulses which are effective to initiate a computer routine;

(c) a digital display adapted to serve as an odometer register;

(d) means for presetting said digital display to a start count and for placing said start count in the memory of a computer; and

(e) electronic computer means for algebraically summing a predetermined constant upon receiving respective ones of the train of shaped pulses, with a present value in the computer memory being the same as the start count, such that the instantaneous count which is held in the memory is progressively updated as each shaped pulse is received, with the count being displayed on the digital display being the same as the count stored in the computer memory, and said predetermined constant being the actual distance traveled between each consecutive pair of pulses in the train of shaped pulses, and the predetermined constant being based upon all of the relevant parameters which are associated with the vehicle on which the odometer is mounted, with said parameters including vehicle wheel size, tire inflation conditions, vehicle speed, and vehicle loading.

4,176,398
RAMP GENERATOR

Dennis G. Rider, Pataskala, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio

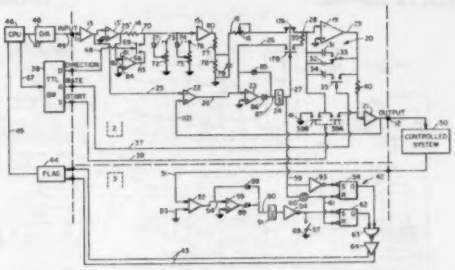
Filed Feb. 27, 1978, Ser. No. 881,848
Int. Cl.[2] G06J *1/00*; H03K *4/08*
U.S. Cl. 364—607 **36 Claims**

1. Apparatus for receiving a succession of input voltages that may vary in discrete steps in amplitude and polarity with time and providing a substantially linear ramp output voltage responsive thereto, comprising

means for receiving each input voltage and providing a potential responsive thereto,

integrating means for receiving each potential, providing in response thereto an output voltage that changes approximately proportionally with time from its old value responsive to the preceding input voltage and potential to a new value that is responsive to the new input voltage and potential each time an input voltage is received that differs by more than a negligible amount from the preceding one, and then maintaining the output voltage substantially constant until the next such time, and

difference amplifier means for receiving a first voltage porportional to the input voltage and a second voltage proportional to the output voltage and providing a comparison voltage responsive to any more than negligible difference between the first and second voltages, switching



means responsive to the difference amplifier means for connecting the integrating means selectively, either

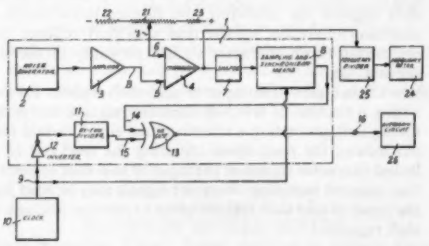
(a), while such a difference exists, to the potential responsive to the input voltage, for beginning and then continuing its integrating, or

(b), when such a difference does not exist, to the comparison voltage, for correcting the output voltage when necessary, to a value that is a predetermined proportion of the input voltage, and, when the output voltage is correct, maintaining it substantially constant.

4,176,399
ANALOG NOISE GENERATOR

Jean-Claude Hoffmann; Francis Castanié, both of Toulouse; Henri Crabère, l'Union; Jean-Pierre Verdier, Cazeres, and Norbert Voisin, Bruguieres, all of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Apr. 21, 1978, Ser. No. 898,686
Claims priority, application France, May 6, 1977, 77 13883
Int. Cl.[2] G06F *1/02*; H03B *29/00*
U.S. Cl. 364—717 **4 Claims**



1. A binary random noise generator for the stochastic coding of digital or analog information, comprising:

means for generating a binary signal with random transitions;

means for sampling said binary signal;

a clock generating a clock signal;

means for synchronizing said sampling means by said clock signal;

a divider dividing said clock signal by two;

an exclusive OR gate having two inputs, one of said inputs receiving the signal from said by-two divider and the other of said inputs receiving the signal from said sam-

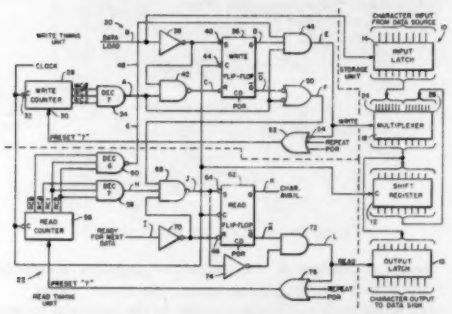
pling means, whereby the output of said exclusive OR gate has a strict equiprobability of its two logic states.

4,176,400

BUFFER STORAGE AND CONTROL

George Heckel, Mundelein, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Aug. 10, 1977, Ser. No. 823,248
Int. Cl.[2] G06F *7/38, 3/00*
U.S. Cl. 364—900 **16 Claims**



1. An intermediate storage memory circuit including a shift register for storing a plurality of multilevel character signals said shift register having an inherent character signal propagation time delay; the shift register having a clocking input receiving a series of clock signals, said shift register advancing the character signals successively therethrough in response to the clock signals comprising:

means responsive to a write signal for alternately switching the multilevel input to said shift register between the output of said shift register and incoming multilevel character signals,

a write timing unit responsive to said incoming multilevel character signals and generating said write signal in response to the presence of an incoming multilevel character signal so that said switching means recirculates character signals through said shift register in the absence of an incoming character signals and introduces an incoming character signal into the input of said shift register in response to said write signal, wherein said write timing unit includes means responsive to a full condition of said shift register for inhibiting the further introduction of incoming character signals into said shift register thus preserving those character signals presently in the shift register, and

means connected to the input of said shift register for providing a readout of selected character signals, and a read timing unit generating a selective read signal to said readout means, the read signal initiating the read out of selected character signals at the input of said shift register so that selected incoming character signals may be read from the input of said shift register prior to passage through the shift register.

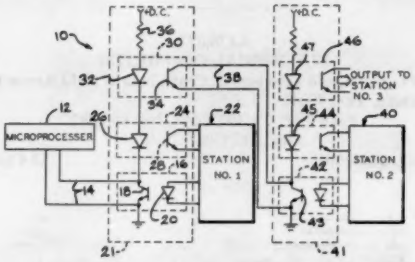
4,176,401

DIGITAL COMMUNICATIONS SYSTEM

John W. Lonberger, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Mar. 1, 1978, Ser. No. 882,499
Int. Cl.[2] H03K *3/42*
U.S. Cl. 364—900 **8 Claims**

1. A digital serial data interface for connecting a data transmitting and receiving station having an input and an output to the output of a preceding station and to the input of a succeeding station, said interface comprising first, second and third photocouplers each having a drive element optically coupled to a driven element, a voltage source, means connecting the drive elements of said first and second photocouplers and the driven element of said third photocoupler in series with said voltage source, means connecting the output of said preceding station in parallel with said driven element of said third photocoupler, means connecting said drive element of said



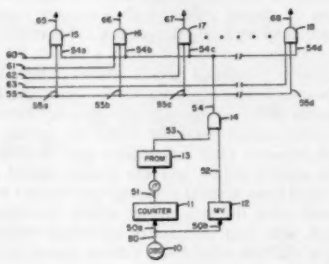
third photocoupler to the output of said data transmitting and receiving station, means connecting said driven element of said second photocoupler to the input of said data transmitting and receiving station, and means connecting said driven element of said first photocoupler to the input of said succeeding station.

4,176,402

APPARATUS FOR SIMULTANEOUSLY MEASURING A PLURALITY OF DIGITAL EVENTS EMPLOYING A RANDOM NUMBER TABLE

Ralph E. Sipple, Shoreview, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed May 24, 1978, Ser. No. 908,886
Int. Cl.[2] G11C *27/02;* **G06F** *3/04*
U.S. Cl. 364—900 **4 Claims**



1. An apparatus for measuring the occurrence of digital events within a plurality of subject conductors comprising:

periodic signaling means;

a random number table;

means responsively coupled to said periodic signaling means and said random number table for accessing a different entry of said random number table in response to said periodic signaling means;

means responsively coupled to said accessing means for signaling that a sample should be taken based upon the value of said different entry of said random number table;

means responsively coupled to said subject conductors and said signaling means for simultaneously sampling the state of each of said plurality of subject conductors when said signaling is that a sample should be taken; and

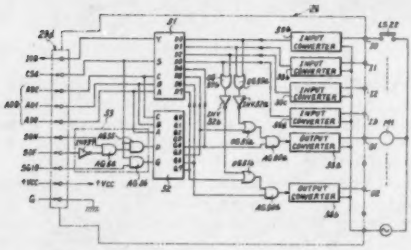
means responsively coupled to said sampling means and said signaling means for recording said state of said subject conductors when said signaling is that a sample should be taken.

4,176,403

PROGRAMMABLE SEQUENCE CONTROLLER

Isao Suzuki, Okazaki; Toshihiko Yomogida, Kariya, and Tsuyoshi Yokota, Okazaki, all of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha, Aichi, Japan

Filed Jun. 20, 1978, Ser. No. 917,257
Claims priority, application Japan, Jun. 23, 1977, 52-74881
Int. Cl.[2] G06F *7/00, 7/02*
U.S. Cl. 364—900 5 Claims



1. A programmable sequence controller comprising:

memory means for storing a sequence of control instructions, each of said instructions including an operation command and address data associated with said operation command, wherein said operation commands include test commands or output commands;

read-out control means for controlling said memory means so as to successively read out each control instruction in said sequence of control instructions therefrom;

at least one input converter connectable to an external input element for converting an operational state thereof into a logical value;

a data selector connected to said input converter and responsive to said address data for selecting said logical value of said input element when the input element is designated by said address data;

logic operation means responsive to a said test command for testing said selected logical value supplied from said data selector and thereafter responsive to a said output command for generating an output command signal based upon the result of the test;

an addressable output memory having at least two storage locations and adapted to store said output command signal at each of said two storage locations as designated by said address data associated with said output command;

gate means connected to said input converter and said two storage locations for inhibiting passage of said output command signal from one of said two storage locations when receiving said logical value of said input element and for enabling passage of said output command signal from the one of said two storage locations when receiving said output command signal from the other of said two storage locations; and

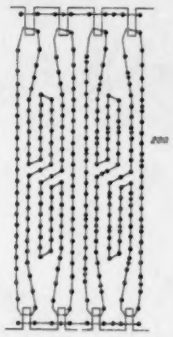
at least one output converter connectable to an external output element and connected to said gate means for energizing said output element based upon said output command signal supplied therefrom.

4,176,404

BUBBLE MEMORY STRUCTURE WITH ENHANCED DATA DENSITY

Magid Y. Dimyan; Wayne C. Hubbell, both of Richardson; Christopher T. M. Chang, Dallas, and John C. Linn, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 13, 1978, Ser. No. 869,349
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—12 22 Claims



1. A magnetic bubble memory structure comprising:

a planar layer of magnetic material in which magnetic bubbles can be moved,

an overlay pattern of magnetically soft material disposed on a major surface of said planar magnetic layer and defining bubble domain propagation paths of individual propagation elements for guiding the movement of said bubbles in said layer in response to a change in orientation of a rotary magnetic field within the plane of said layer,

said bubble domain propagation paths including a magnetic bubble domain storage section for said magnetic bubble domains,

transfer gate means located adjacent to said magnetic bubble domain storage section for transferring magnetic bubble domains out of said bubble domain storage section, and

said bubble domain storage section comprising a plurality of individual propagation elements prearranged to form individual tracks interconnected to form a loop structure wherein a circuit period defining a predetermined distance between propagation elements in said tracks is such that said propagation elements adjacent to said transfer gate means are separated by a greater circuit period than the propagation elements forming the remainder of said bubble domain storage section.

4,176,405

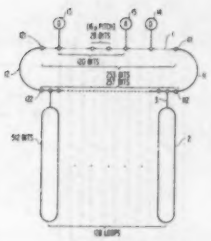
MAGNETIC BUBBLE DEVICE

Nobuya Yoshioka, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Apr. 13, 1978, Ser. No. 895,823
Claims priority, application Japan, Apr. 22, 1977, 52-47078
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—15 2 Claims

1. In a magnetic bubble storage device including a magnetic medium for holding magnetic bubbles; means for giving a bias magnetic field perpendicular to the surface of said magnetic medium; a major loop provided on said magnetic medium; a plurality of minor loops provided on said magnetic medium for storing the magnetic bubbles; and a plurality of gates provided between said major loop and said minor loops for performing transfer of the magnetic bubbles therebetween, the improve-

ment wherein the bit pitch in at least a part of a first region on said major loop other than a second region where said major



loop and said gates are connected is larger than the bit pitch in said second region.

4,176,406

INFORMATION RECORDING AND RECOGNITION

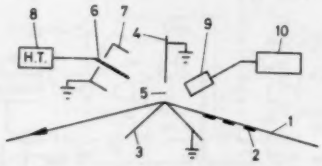
Josef Matkan, Adelaide, Australia, assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.

Filed Nov. 1, 1977, Ser. No. 847,558

Claims priority, application Australia, Nov. 5, 1976, PC8021

Int. Cl.[2] G11C 11/ 2, 11/26

U.S. Cl. 365—148 **12 Claims**



1. A method of information recording and recognition comprising the steps of printing on one surface of a recording member information in the form of ink deposits where such ink deposits contain a substance capable of conferring to such ink deposits electrical conductivity measurable different from that of the non-printed background areas of said recording member, passing said recording member through an information recognition zone, positioning corona generating means adjacent said information recognition zone and directing the ionic emission from said corona generating means towards one face of said recording member, positioning sensor means in said information recognition zone to detect ionization and ion emission changes effected by electrical conductivity differences between said printed ink deposits and non-printed background areas on said recording member and converting the thus detected ionization and ion emission changes into an electrical signal corresponding to said information.

NOVEMBER 27, 1979

253,496
BOOT
William M. Douglas, Old Hickory, Tenn., assignor to The United States Shoe Corporation, Cincinnati, Ohio
Filed Aug. 23, 1977, Ser. No. 827,120
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

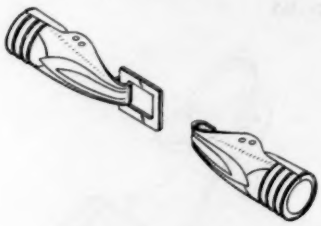
253,497
SKIRT
Doris Brosk, 150 E. 69th St., New York, N.Y. 10023
Filed Dec. 6, 1976, Ser. No. 747,647
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—224

253,498
POCKET-TOP SHOE
Marcella M. Katz, 10573 Le Conte Ave., Los Angeles, Calif. 90024, assignor to Marcella M. Katz, Los Angeles, Calif.
Filed May 23, 1977, Ser. No. 799,561
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—265

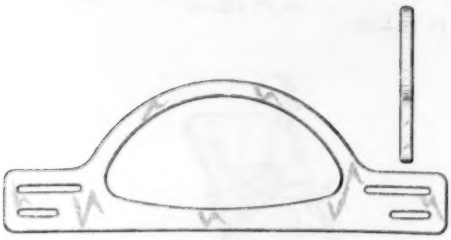
253,499
SKI BOOT
Georges P. J. Salomon, Quintal, France, assignor to Ets. SA Francois Salomon & Fils
Filed Aug. 16, 1977, Ser. No. 826,396
Claims priority, application France, Mar. 3, 1977, 187
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—276

253,500
SHOE SOLE
Joseph P. Famolare, Jr., Putney, Vt., assignor to Famolare, Inc., New York, N.Y.
Filed Apr. 11, 1975, Ser. No. 567,264
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—322

253,501
BELT BUCKLE
Fritz Hoch, Pforzheim, Fed. Rep. of Germany, assignor to Gutos Metallschliessenfabrik Bader & Hoch KG
Filed Apr. 8, 1977, Ser. No. 786,018
Term of patent 3½ years
Int. Cl. D02—*07*
U.S. Cl. D2—418

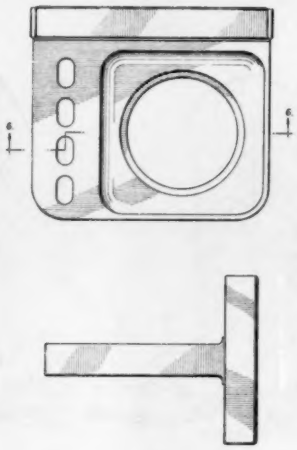


253,502
HANDLE FOR A HANDBAG
Helen Young, Roslyn, N.Y., assignor to N A S Import Corp., New York, N.Y.
Filed Dec. 30, 1977, Ser. No. 866,199
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D3—54



253,503
COMBINED TOWEL BAR AND SHELF UNIT
Gladys Albert, 56-40 Oceania St., Bayside, N.Y. 11364, assignor to Gladys Albert, Bayside, N.Y.
Filed Jun. 1, 1978, Ser. No. 912,048
Term of patent 3½ years
Int. Cl. D6—*04*
U.S. Cl. D6—91

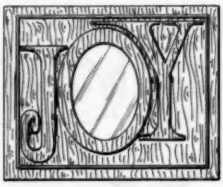
253,504
COMBINED TOOTHBRUSH AND GLASS HOLDER
Raymond Grosfillex, Arbent, France, assignor to Grosfillex S.A.R.L., Argent, France
Filed Aug. 1, 1978, Ser. No. 929,911
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—92



253,505
DRINKING GLASS RACK
Donald B. LeSage, 630 Bushaway Rd., Wayzata, Minn. 55391, and Franklin D. Dutcher, Rte. #1, Box 151, Cambridge, Minn. 55008
Filed Oct. 3, 1977, Ser. No. 839,124
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—113

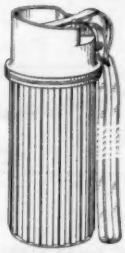
253,506
CORNER PROTECTOR FOR FURNITURE OR THE LIKE
Henry R. Vigue, Waterville, Me., assignor to Keyes Fibre Company
Filed Jul. 29, 1976, Ser. No. 709,635
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

253,507
PICTURE FRAME
Joseph R. English, 1168 Oakleigh Dr., East Point, Ga. 30344
Filed Dec. 12, 1977, Ser. No. 859,257
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—236

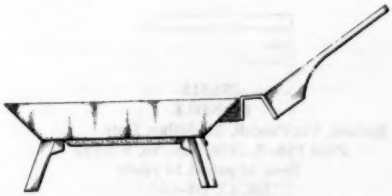


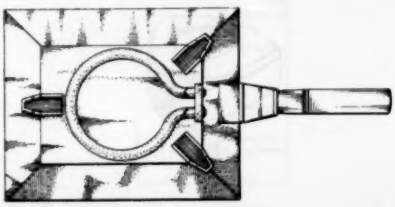
253,508
COMPARTMENTED CONDIMENT DISPENSER
John L. Sutton, 11A S. Manor Rd., Broomall, Pa. 19008, assignor to John L. Sutton, Broomall, Pa.
Filed Jun. 8, 1977, Ser. No. 804,760
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—57

253,509
INSULATED BOTTLE
John S. Doyel, 404 W. 20th St., New York, N.Y. 10011
Filed Jun. 17, 1977, Ser. No. 807,596
Term of patent 14 years
Int. Cl. D07—*01*
U.S. Cl. D7—77

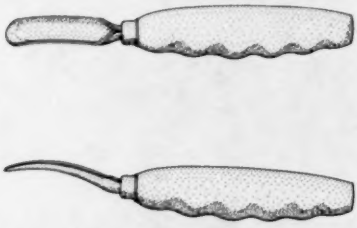


253,510
ELECTRIC CREPE PAN
Robert S. Bardin, 409 Onda, Newport Beach, Calif. 92660
Filed May 24, 1977, Ser. No. 800,093
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—94

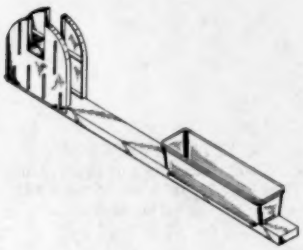




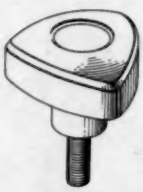
253,511
PEELING UTENSIL FOR HARD BOILED EGGS
Jerry Bogosian, 14378 Fielding, Detroit, Mich. 48223
Filed Apr. 20, 1977, Ser. No. 789,114
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—147



253,512
COMBINED TAPE DISPENSING AND COATING APPARATUS FOR USE WITH DRY WALLS
Ray G. Davenport, 23324 N. Dustin Rd., Acampo, Calif. 95220, and Owen C. McCollum, 3304 McAllen Rd., Stockton, Calif. 95205
Filed Dec. 29, 1978, Ser. No. 974,537
Term of patent 14 years
Int. Cl. D8—*05;* D19—*02*
U.S. Cl. D8—14

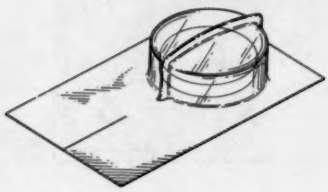


253,513
HANDLE
Alberto Bertani, Via Pascoli, 21, Milan, Italy
Filed Feb. 7, 1978, Ser. No. 875,910
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—307

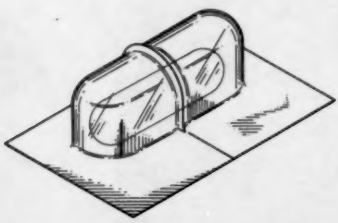


253,514
FOOD CONTAINER
Doris C. Eteison, Cooper Morris Dr., Pomona, N.Y. 10970
Filed Apr. 29, 1977, Ser. No. 792,481
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—185

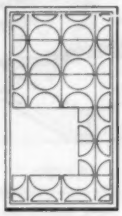
253,515
PHARMACEUTICAL BLISTER PACKAGE
Eugene J. Meierhoefer, Hackettstown, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed May 10, 1977, Ser. No. 795,571
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192



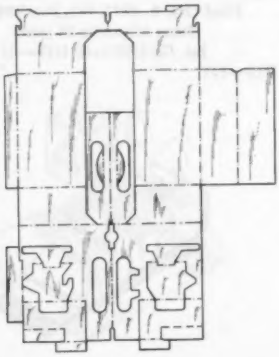
253,516
PHARMACEUTICAL BLISTER PACKAGE
Eugene J. Meierhoefer, Hackettstown, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed May 10, 1977, Ser. No. 795,572
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192



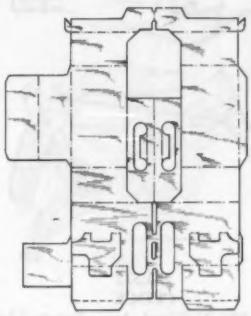
253,517
PACKAGING CONTAINER
Adam J. Grodin, Forest Hills, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Feb. 15, 1977, Ser. No. 768,921
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—225



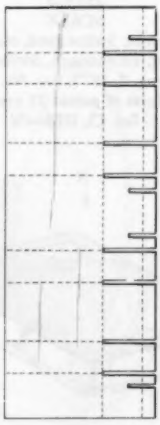
253,518
CARTON BLANK
Bruno C. Bonczyk, East Alton, Ill., assignor to Alton Box Board Company, Alton, Ill.
Filed Feb. 4, 1977, Ser. No. 765,686
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245



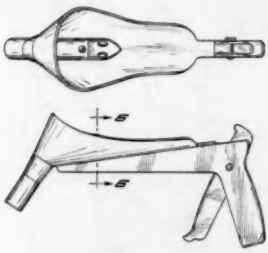
253,519
CONTAINER CARRIER BLANK
Stephen J. Green, Richmond Heights, Mo., assignor to Alton Box Board Company, Alton, Ill.
Filed Mar. 2, 1977, Ser. No. 773,591
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245



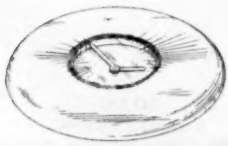
253,520
CARTON BLANK
Thomas B. Dempster, Sioux City, Iowa, assignor to Champion International Corporation, Stamford, Conn.
Filed May 18, 1977, Ser. No. 798,036
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245



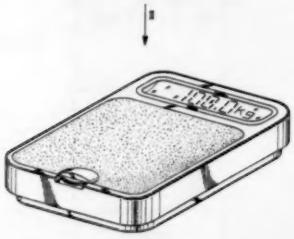
253,521
COMBINED OPENER AND SPOUT FOR AN OIL CAN
Martin A. Makela, Waconia, Minn., assignor to J-Mark, Inc., Minneapolis, Minn.
Filed May 31, 1977, Ser. No. 801,516
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—290



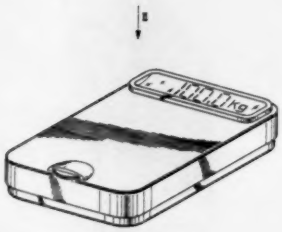
253,522
CLOCK
Uwe Rutenberg, 128 Maitland Ave., Pointe Claire, Quebec, Canada (H9R 3X4)
Filed May 11, 1977, Ser. No. 795,801
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—22



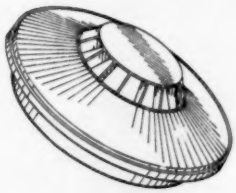
253,523
SCALE
Peter Ackeret, Küsnacht, Switzerland, assignor to Ackeret Design & Engineering, Ebmatingen, Switzerland
Filed Nov. 2, 1977, Ser. No. 847,944
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—92



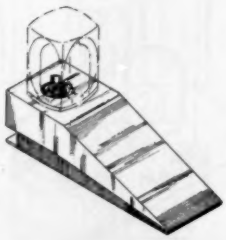
253,524
SCALE
Peter Ackeret, Küsnacht, Switzerland, assignor to Ackeret Design & Engineering, Ebmatingen, Switzerland
Filed Nov. 2, 1977, Ser. No. 847,946
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—92



253,525
SMOKE DETECTOR
Kent R. Wilson, Jefferson County, Colo., assignor to Statitrol Division Emerson Electric Co., Lakewood, Colo.
Filed Dec. 7, 1977, Ser. No. 858,468
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106

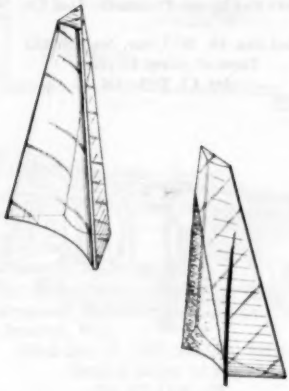


253,526
DOOR-ACTUATED ACTIVATOR FOR FLASHLAMP ARTICLE
Andre C. Bouchard, Peabody, and Harold H. Hall, Jr., Marblehead, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed Oct. 5, 1977, Ser. No. 839,429
Term of patent 14 years
Int. Cl. D10—*06;* D13—*03*
U.S. Cl. D10—121



253,527
PIN
Reuben Bellows, 4857 Laurel Grove, North Hollywood, Calif. 91603
Filed Feb. 6, 1978, Ser. No. 875,604
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—55

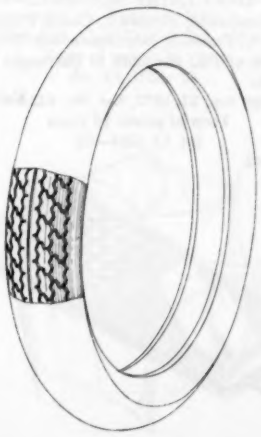
253,528
ORNAMENT OR THE LIKE
George C. Sun, 530 Rhode Island Ave., Cherry Hill, N.J. 08002
Filed Jan. 27, 1978, Ser. No. 873,091
Term of patent 14 years
Int. Cl. D11—*05*
U.S. Cl. D11—131



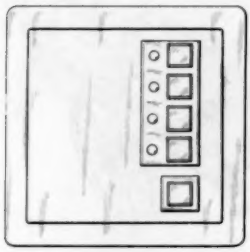
253,529
MOOD INDICATOR
Carl F. Yandt, 703 Oak Ter., La Crescent, Minn. 55947
Filed May 9, 1977, Ser. No. 795,314
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—157

253,530
TRICYCLE
Robert D. Perkins, Toronto, Canada, assignor to Willowdale Handcar and Wagon Works Ltd., Toronto, Canada
Filed Aug. 22, 1978, Ser. No. 936,572
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—112

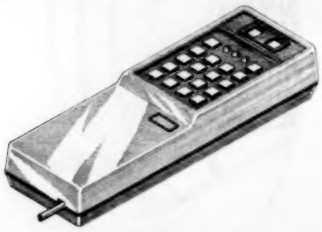
253,531
TIRE
David L. Buck, and David M. Lamb, both of Sutton Coldfield, England, assignors to Dunlop Limited, London, England
Filed Apr. 1, 1977, Ser. No. 783,761
Claims priority, application United Kingdom, Oct. 21, 1976, 977599
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—145



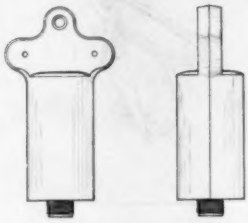
253,532
REMOTE DIMMING CONTROL SYSTEM
Noel Mayo, Philadelphia, Pa., assignor to Lutron Electronics Co., Inc., Coopersburg, Pa.
Division of Ser. No. 726,524, Sep. 27, 1976, Pat. No. Des. 249,141. This application Mar. 8, 1978, Ser. No. 884,727
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—32



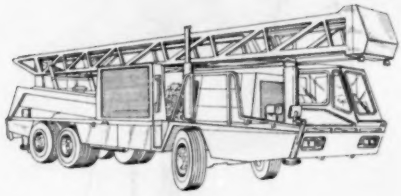
253,533
DATA ENTRY TERMINAL
Jerry J. Sims, Southfield; Richard E. Carell, Plymouth, both of Mich.; Frank C. Donofrio, Norristown, and Warren T. Zivie, Malvern, both of Pa., assignors to Burroughs Corporation, Detroit, Mich.
Filed Sep. 22, 1977, Ser. No. 835,840
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—42



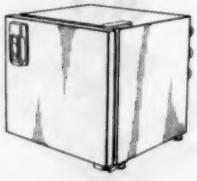
253,534
ANTENNA BALUN
Oliver W. Greene, Bedford, N.H., assignor to Bencher, Inc., Chicago, Ill.
Filed Jun. 27, 1977, Ser. No. 810,045
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D14—90



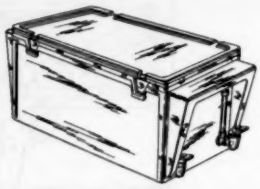
253,535
MOBILE ROTARY DRILL RIG
Walter A. Schmidt; Jack D. Smith, and Jay R. Cory, all of Enid, Okla., assignors to Chicago Pneumatic Tool Co., New York, N.Y.
Filed Jan. 19, 1977, Ser. No. 760,453
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—21

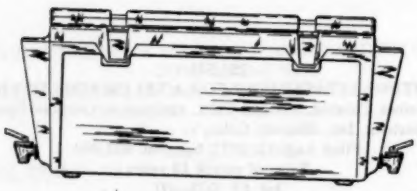


253,536
REFRIGERATOR
Motonari Shibata, and Yuichi Hirayama, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma and Matsushita Reiki Co., Ltd., Osaka, both of, Japan
Filed Oct. 13, 1977, Ser. No. 841,852
Claims priority, application Japan, May 20, 1977, 52-19543
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—88

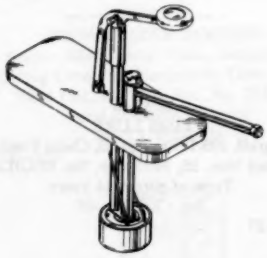


253,537
BEVERAGE CONTAINER AND SERVER
Richard H. Seager, Mystic, Conn., assignor to King-Seeley Thermos
Filed Nov. 21, 1977, Ser. No. 853,645
Term of patent 14 years
Int. Cl. D07—*04*
U.S. Cl. D15—115

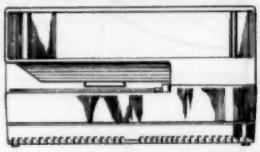


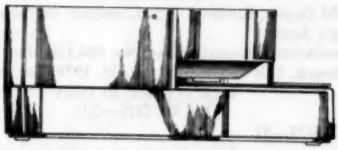


253,538
PUMP DISPENSER FOR SODA FOUNTAINS
James W. Brutsman, Cheyenne, Wyo., assignor to Wyott Corporation, Cheyenne, Wyo.
Filed Jun. 17, 1977, Ser. No. 807,541
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—120

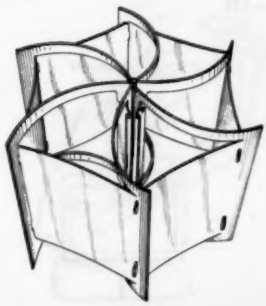


253,539
PRINTER HOUSING
John B. Coppola, Trumbull, and William A. Ottersen, Norwalk, both of Conn., assignors to Bunker Ramo Corporation, Oak Brook, Ill.
Filed May 5, 1977, Ser. No. 794,206
Term of patent 14 years
Int. Cl. D18—*02*
U.S. Cl. D18—13

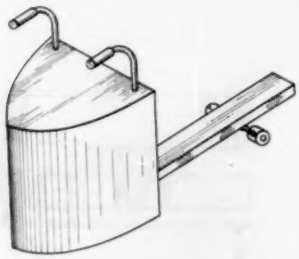




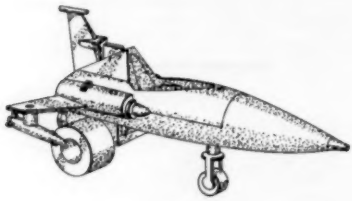
253,540
MULTI-SIDED DISPLAY SUPPORT OR THE LIKE
Alan J. Rothchild, East Northport, N.Y., assignor to Rothchild Printing Company, Ltd., Elmhurst, N.Y.
Filed Aug. 12, 1977, Ser. No. 824,199
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D20—42



253,541
COASTER
Raymond Fragoso, 1967 Courtland Ave., Oakland, Calif. 94601
Filed Aug. 18, 1977, Ser. No. 825,551
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—81



253,542
TOY JET
Iwakichi Ogawa, Kashiwa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Continuation-in-part of Ser. No. 694,138, Jun. 9, 1976, abandoned. This application Apr. 21, 1978, Ser. No. 899,094
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—87



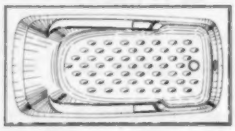
253,543
SIMULATIVE TOY DESK
Edward M. Ferguson, Nashville, Tenn., assignor to Kusan, Inc., Nashville, Tenn.
Filed Feb. 2, 1978, Ser. No. 874,370
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—121

253,544
OPTICAL SIGHT MOUNT
Ronald E. Elbe, 2830 Cedar St., Davenport, Iowa 52804
Filed Oct. 17, 1977, Ser. No. 842,835
Term of patent 14 years
Int. Cl. D22—*01*
U.S. Cl. D22—7

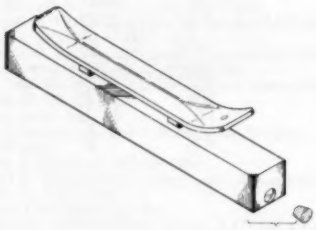
253,545
SIGHTING ATTACHMENT FOR A TELESCOPIC DEVICE
M. Gaines Chesnut, Arvada, Colo., assignor to Outdoor Sports Industries, Inc., Denver, Colo.
Filed Aug. 12, 1977, Ser. No. 823,950
Term of patent 14 years
Int. Cl. D22—*01*
U.S. Cl. D22—8

253,546
FISH LURE
William E. Hogreff, 295 D St., Apt. B, Chula Vista, Calif. 92010
Filed Nov. 25, 1977, Ser. No. 855,012
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

253,547
BATHTUB
Richard S. Beddome, Irvine, and Dean Myers, Santa Ana, both of Calif., assignors to Kimstock, Inc., Santa Ana, Calif.
Filed Nov. 15, 1978, Ser. No. 961,144
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55

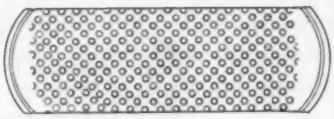


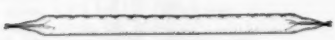
253,548
COMBINED STICK INCENSE BURNER AND STORAGE COMPARTMENT
Morton A. Gruber, 188 Haypath Rd., Old Bethpage, N.Y. 11804
Filed Jan. 25, 1978, Ser. No. 872,345
Term of patent 14 years
Int. Cl. D23—*99*
U.S. Cl. D23—78



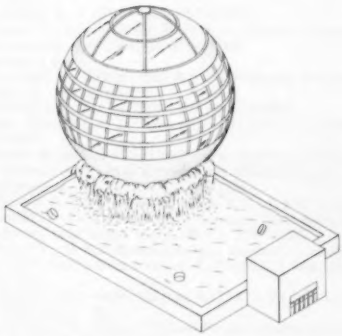
253,549
DEODORIZER HOUSING
Richard J. Seager, Manchester, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.
Filed Oct. 13, 1976, Ser. No. 732,180
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150

253,550
SANITARY NAPKIN
Robert J. Roeder, Appleton, Wis., assignor to Kimberly-Clark Corporation
Filed Nov. 13, 1978, Ser. No. 960,283
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—51

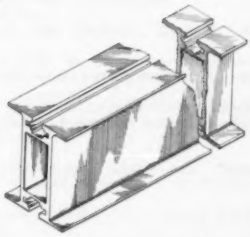




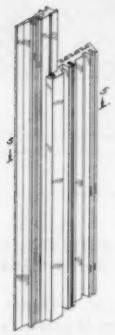
253,551
COMBINED BUILDING AND FOUNTAIN
Timothy Roberts, Jr., Box R-BHI-HDMC, New York, N.Y. 09202
Filed Oct. 28, 1977, Ser. No. 846,607
Term of patent 3½ years
Int. Cl. D25—*03*
U.S. Cl. D25—7



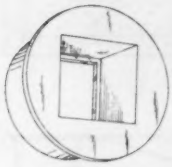
253,552
EXTRUDED BEAM
James C. Durbin, 2000 Old Lost Mountain Rd., Powder Springs, Ga. 30073
Filed Mar. 3, 1977, Ser. No. 773,945
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75



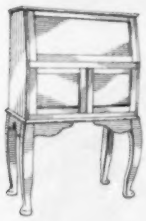
253,553
COMBINED DOOR AND WALL SEALER FOR A GREENHOUSE FRAME
Donald R. Hunter, 20490 Olympia, Detroit, Mich. 48240
Filed Sep. 21, 1977, Ser. No. 835,250
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—76



253,554
ELASTIC FRAME FOR FIREPROOF FEED-THROUGH OF ELECTRIC CABLES IN WALLS OF CONCRETE OR ROCK OR THE LIKE
Erik M. Blomqvist, Karlskrona, Sweden, assignor to AB Lyckeaborgs Bruk, Karlskrona, Sweden
Filed Dec. 21, 1976, Ser. No. 757,224
Claims priority, application Sweden, Sep. 23, 1976, 761851
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—90



253,555
AQUARIUM
Michelle E. Browne, 6678 SW. 140th Ct., Miami, Fla. 33183
Filed Sep. 14, 1978, Ser. No. 942,312
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—9



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF NOVEMBER, 1979

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & H Mfg. Co.: *See—*
Feibelman, Jeffrey A., 4,175,660, Cl. 206-468.000.

A-T-O Inc.: *See—*
Becker, Michael L.; and Wilfong, William G., 4,175,364, Cl. 53-539.000.

AB Resmastservice: *See—*
Andersson, Bengt V., 4,175,908, Cl. 414-786.000.

Abbott Laboratories: *See—*
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,176,178, Cl. 424-180.000.
Winn, Martin; and Kyncl, John J., 4,176,191, Cl. 424-274.000.

Abex Corporation: *See—*
Kulik, George J.; Meslink, Michael C.; and Mulder, James P., 4,176,391, Cl. 362-390.000.

Abrahams, Roy H.: *See—*
Laidler, John B.; and Abrahams, Roy H., 4,176,158, Cl. 423-2.000.

ACF Industries, Incorporated: *See—*
Kacal, Gary W.; and Partridge, Charles C., 4,175,577, Cl. 137-15.000.
Phelan, Michael B., 4,175,526, Cl. 123-136.000.

Achelpohl, Fritz; and Schneider, Horst, to Windmoller & Holscher. Apparatus for making chains of sacks. 4,176,000, Cl. 156-510.000.

Adam, Robert A.: *See—*
Kranich, Joel H.; Adam, Robert A.; and Culbertson, Charles L., 4,175,807, Cl. 312-118.000.

Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I. Tangential expander for oil control piston rings. 4,175,758, Cl. 277-220.000.

Aechter, Burckhard; and Gerlach, Manfred, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Apparatus for measuring the time between received pulses. 4,176,337, Cl. 367-131.000.

Ag Superior, Inc.: *See—*
Scheffler, Edward D., 4,175,368, Cl. 56-328.00R.

Agence Nationale de Valorisation de la Rechercha (ANVAR): *See—*
Gibert, Henri, 4,175,334, Cl. 34-5.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Duchene, Georges, 4,175,542, Cl. 126-449.000.
Quenisset, Jean-Michel; Naslain, Rober; and Hagenmuller, Paul, 4,176,002, Cl. 156-601.000.

AGFA-Gevaert, A.G.: *See—*
Credner, Hans-Heinrich; and Schranz, Karl-Wilhelm, 4,175,968, Cl. 430-559.000.
Jores, Willi, 4,175,713, Cl. 242-56.00R.
Rapp, Heinz; Biedermann, Ernst; and Wittenbrink, Dieter, 4,175,857, Cl. 355-73.000.

Air Products and Chemicals, Inc.: *See—*
Miller, Keith A.; and Osmundson, Eric C., 4,175,396, Cl. 62-63.000.

Airaksinen, Markku, to Multilift Oy. Apparatus for mounting, demounting, and tipping vehicles. 4,175,904, Cl. 414-421.000.

Ajinomoto Co., Inc.: *See—*
Sakakibara, Shumpei; Nagai, Yutaka; Fujiwara, Kenji; and Sakai, Takahiro, 4,176,009, Cl. 435-24.000.

Aktiengesellschaft Cilander: *See—*
Muller, Hermann, 4,175,997, Cl. 156-362.000.

Aktieselskabet Funki Maskinfabrik: *See—*
Jorgensen, Niels, 4,175,596, Cl. 141-18.000.

Alberto-Culver Company: *See—*
Cella, John A.; and Fiebig, August E., Jr., 4,176,176, Cl. 424-70.000.

Albright, William D.: *See—*
Bennon, Saul; and Albright, William D., 4,176,333, Cl. 336-60.000.

Alcan Research and Development Limited: *See—*
Dethloff, Finn H., 4,176,019, Cl. 204-67.000.

Aldag, Henry R.; Morton, Richard G.; and Woodroffe, Jaime A., to Jersey Nuclear-Avco Isotopes, Inc. High performance dye laser and flow channel therefor. 4,176,324, Cl. 331-94.50T.

Alexander, A. Gordon; and Coupland, Keith, to Exxon Research & Engineering Co. Dioxime and hydroxy benzoic acid metal salt antioxidants for lithium soap grease compositions. 4,176,075, Cl. 252-42.100.

Alford Industries, Inc.: *See—*
Moir, David, 4,176,147, Cl. 264-25.000.

Allegheny Ludlum Industries, Inc.: *See—*
Southern, Raymond L.; and Reen, Orville W., 4,175,921, Cl. 432-261.000.

Allen, Donovan J. Plant aerator tube. 4,175,356, Cl. 47-66.000.

Allen, Terry M.; and Derfler, William D. Lightweight costume head. 4,175,411, Cl. 2-173.000.

Allied Chemical Corporation: *See—*
Linares, Robert C.; and Ambasz, Wiktor, 4,175,950, Cl. 75-53.000.

Alsberg, Henry; Skalla, Dale; and Meisenhelder, William C., to Richardson Company, The. Polystyrene phonograph record injection molding compositions of improved transparency. 4,176,104, Cl. 260-28.50R.

Alten, Kurt. Closure structure, especially for openings in a building. 4,175,608, Cl. 160-273.00R.

Altenweger, Alois, to Zellweger Uster AG. Thread gripper. 4,175,307, Cl. 28-211.000.

AM International, Inc.: *See—*
Nelson, Alfred M., 4,176,362, Cl. 346-74.100.

Amazonen-Werke H. Dreyer: *See—*
Dreyer, Heinz, 4,175,705, Cl. 239-651.000.

Amba Marketing Systems, Inc.: *See—*
Schimmel, Otto K., 4,175,329, Cl. 33-23.00R.

Ambasz, Wiktor: *See—*
Linares, Robert C.; and Ambasz, Wiktor, 4,175,950, Cl. 75-53.000.

Ament, Eduard: *See—*
Andres, Rudolf; and Ament, Eduard, 4,175,633, Cl. 180-270.000.

Amerace Corporation: *See—*
Andersen, Charles E.; and Simons, Craig W., 4,175,815, Cl. 339-61.00R.

American Fiber Velope Manufacturing Co.: *See—*
Tripler, John G., 4,175,478, Cl. 93-62.000.

American Optical Corporation: *See—*
Siegmund, Walter P., 4,175,940, Cl. 65-4.00A.

American Standard Inc.: *See—*
Tonges, Gerald A.; and Elmlinger, Eugene L., 4,175,774, Cl. 283-6.000.

Ametek, Inc.: *See—*
Harland, Philip W., 4,175,444, Cl. 73-738.000.

Ammann, Stephen K.; and Herborn, Peter E., to Quantor Corporation. Microfiche recorder. 4,175,854, Cl. 355-54.000.

AMP Incorporated: *See—*
Coldren, Daniel R.; Krider, Paul R.; and Williams, Benjamin C., 4,175,811, Cl. 339-19.000.
Hughes, Donald W. K., 4,175,819, Cl. 339-176.00M.
Kourimsky, Friedrich J. A.; and John, Heinrich, 4,175,818, Cl. 339-176.0MP.

Andersen, Charles E.; and Simons, Craig W., to Amerace Corporation. Connector element with means for reducing effects of radial void in electrical connection. 4,175,815, Cl. 339-61.00R.

Anderson, Clarence A. Plant growing device. 4,175,354, Cl. 47-39.000.

Anderson, John M., to General Electric Company. Core mounting for solenoidal electric field lamps. 4,176,296, Cl. 315-71.000.

Andersson, Bengt V., to AB Resmastservice. Method of loading and unloading heavy objects from a vessel. 4,175,908, Cl. 414-786.000.

Ando, Shigeki: *See—*
Iwako, Hiroyuki; and Ando, Shigeki, 4,175,873, Cl. 366-165.000.

Andreadakis, Nicholas C.: *See—*
Kirchner, Richard K.; Mayer, William N.; and Andreadakis, Nicholas C., 4,176,298, Cl. 315-169.200.

Andres, Rudolf; and Ament, Eduard, to Daimler-Benz Aktiengesellschaft. Installation for feeding the lock tongue and/or the belt band of a belt system. 4,175,633, Cl. 180-270.000.

Angelini, Sergio, to Fiat, S.p.A. Method for chromium electroplating of bars. 4,176,015, Cl. 204-28.000.

Ankersmit, Hendrik J. Method for the separation from each other of the components of a mixture of water, oil and dirt (sludge) as well as apparatus for performing said method. 4,176,068, Cl. 210-295.000.

Annen, Klaus; Laurent, Henry; Hofmeister, Helmut; Wiechert, Rudolf; Wendt, Hans; and Kapp, Joachim-Friedrich, to Schering Aktiengesellschaft. Novel corticoids. 4,176,126, Cl. 260-397.450.

Anstalt Europaische Handelsgesellschaft: *See—*
Gaetzi, Robert, 4,176,246, Cl. 178-22.000.

Ansul Company, The: *See—*
Poeschl, Paul M.; and Stockwell, David L., 4,175,677, Cl. 222-5.000.

Antos, George J., to UOP Inc. Superactive multimetallic catalytic composite comprising platinum group metal and rhenium. 4,176,088, Cl. 252-441.000.

Aoki, Kiyoshi; and Kamo, Hisao, to Tokyo Shibaura Electric Co., Ltd. Method for manufacturing junction type field-effect transistors. 4,175,317, Cl. 29-571.000.

Aoki, Teruaki: *See—*
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawana, Yoshiyuki, 4,176,372, Cl. 357-52.000.

Aoyama, Kazuho: *See—*
Otsuki, Yutaka; Araki, Yoshihiko; and Aoyama, Kazuho, 4,176,110, Cl. 260-31.80N.

Apblett, William R., Jr., to Foster Wheeler Energy Corporation. Stress control collar. 4,175,779, Cl. 285-115.000.

Arai, Akira: *See—*
Fukushima, Toshihiko; Fujie, Kunio; Arai, Akira; Arai, Nobukatsu; and Kakizaki, Kimio, 4,175,416, Cl. 72-254.000.

Arai, Nobukatsu: *See*—
Fukushima, Toshihiko; Fujie, Kunio; Arai, Akira; Arai, Nobukatsu; and Kakizaki, Kimio, 4,175,416, Cl. 72-254.000.

Arai, Toshio, to Kabushiki Kaisha Morita Sanshoku. Dental treatment tool. 4,175,324, Cl. 433-122.000.

Araki, Yoshihiko: *See*—
Otsuki, Yutaka; Araki, Yoshihiko; and Aoyama, Kazuho, 4,176,110, Cl. 260-31.80N.

ARBED Acieries Reunies de Burbach-Eich-Dudelange S.A.: *See*—
Baumert, Jean, 4,175,612, Cl. 164-449.000.
Blondelot, Emile; Economopoulos, Marios; and Wilmotte, Stephan H., 4,175,985, Cl. 148-12.400.

Archdale, Robert W.: *See*—
Crane, John L.; Archdale, Robert W.; and Webb, Alan E., 4,175,912, Cl. 416-193.00A.

Archer, Robert A.; and Day, William A., to Eli Lilly and Company. Stereoselective preparation of hexahydro dibenzopyranones and intermediates therefor. 4,176,233, Cl. 560-249.000.

Ardal og Sunndal Verk a.s.: *See*—
Dethloff, Finn H., 4,176,019, Cl. 204-67.000.
Nebell, Hans G. T., 4,176,037, Cl. 204-243.00M.

Arenberg, Irving K.; and Newkirk, John B. Biological drainage shunt. 4,175,563, Cl. 128-350.00V.

Arfert, Horst F. W.: *See*—
Reynolds, William G.; and Arfert, Horst F. W., 4,175,670, Cl. 220-70.000.

Armstrong Cork Company: *See*—
Rueggeberg, Werner, 4,176,267, Cl. 219-10.55A.

Arnold, Reginald S.: *See*—
Tachick, Henry N.; Arnold, Reginald S.; Belcher, James E.; and St. Jacques, Joseph A., 4,175,817, Cl. 339-111.000.

Aronis, Thomas P. Stringed musical instrument. 4,175,466, Cl. 84-288.000.

Aronson, Michael P.: *See*—
Princen, Henricus M.; and Aronson, Michael P., 4,176,200, Cl. 426-250.000.

Artos Engineering Company: *See*—
Gudmestad, Ragnar, 4,175,316, Cl. 29-564.400.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Ide, Akira; and Matsumoto, Sojiro, 4,176,132, Cl. 260-453.00A.
Misumi, Teruyuki; Furuhashi, Susumu; and Shiga, Masaaki, 4,176,020, Cl. 204-72.000.

Asahimatsu Koridofu Kabushiki Kaisha: *See*—
Kumagaya, Teruo, 4,175,482, Cl. 99-330.000.

Asakura, Toshikazu: *See*—
Kasai, Kaname; Mukumoto, Takaji; Asakura, Toshikazu; and Ueda, Ryoji, 4,175,408, Cl. 64-26.000.

Asano, Eijiro; and Komori, Ryuichi, to Diesel Kiki Co., Ltd. Pneumatic governor control apparatus for engine fuel injection system. 4,175,530, Cl. 123-140.0FG.

Asano, Tetsumasa; Yatsuki, Osamu; Fujimoto, Kazuyuki; and Hashimoto, Harutoshi, to Mitsubishi Denki Kabushiki Kaisha. Speed control apparatus. 4,176,306, Cl. 318-772.000.

Asanuma, Akira; Taneda, Nobuo; Hasegawa, Ryozo; Jindai, Shohei; and Morishita, Toshio, to Teijin Limited. Method for heat-sterilizing artificial kidneys. 4,176,156, Cl. 422-25.000.

Ashdown, Ronald A.; Ewing, Keith; and Birkenhead, Stuart I., to Foster Wheeler Energy Corporation. Isolating/pressure relief damper. 4,175,582, Cl. 137-334.000.

Ateliers de Constructions Electriques de Charleroi (ACEC): *See*—
Bingen, Roald, 4,176,237, Cl. 13-27.000.

Ateliers des Charmilles S.A.: *See*—
Piguet, Pierre, 4,175,707, Cl. 239-456.000.

Atkins, Kenneth E.: *See*—
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., 4,176,106, Cl. 260-29.300.
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., 4,176,216, Cl. 521-106.000.

Atlantic Richfield Company: *See*—
Davis, Robert R.; Sill, Richard C.; and Yerkes, John W., 4,175,980, Cl. 136-89.0FC.
Yoo, Jin S.; and Milam, Ronald L., 4,176,085, Cl. 252-428.000.

AUGAT Inc.: *See*—
Holt, Richard C.; Damon, Neil F.; and Hanlon, Richard J., 4,175,810, Cl. 339-17.00C.

Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lilfie, Christian; Diederen, Willi; and Haarmann, Walter, to Boehringer Ingelheim GmbH. Imidazoisoquinolinediones and salts thereof. 4,176,184, Cl. 424-248.520.

Authier, Bernhard: *See*—
Zauhar, Helmut; Authier, Bernhard; Luptovits, Roland; and Schmidhammer, Leonhard, 4,175,610, Cl. 164-60.000.

Auto-Miser International Manufacturing Corp.: *See*—
Johnson, Edward E., 4,175,525, Cl. 123-134.000.

Automatic Liquid Packaging, Inc.: *See*—
Weiler, Gerhard H.; Nagel, Dieter H.; and Pagels, Louis T., 4,176,153, Cl. 264-524.000.

Avera, Fitzhugh L. Non-dusting agent and method of manufacture. 4,175,976, Cl. 106-162.000.

Averbukh, Matvei I.: *See*—
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.

Avril, Arthur C. Machine for drying granular materials. 4,175,335, Cl. 34-128.000.

Axenov, Viktor F.: *See*—
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.

Aziz, Walid Y.; and Ball, Lawrence E., to Standard Oil Company. Reinforced xylene-formaldehyde resin compositions. 4,176,095, Cl. 260-9.000.

B.C. Richards & Co. Pty. Ltd.: *See*—
Richards, Cecil G., 4,175,726, Cl. 251-315.000.

Babcock, William E.; and Hess, Ronald L., to RCA Corporation. Television S-correction linearity device. 4,176,303, Cl. 315-400.000.

Bachert, Peter, to Motorola, Inc. Frequency multiplier. 4,176,332, Cl. 333-218.000.

Bacus, James W., to Rush-Presbyterian-St. Luke's Medical Center. Dual resolution method and apparatus for use in automated classification of pap smear and other samples. 4,175,860, Cl. 356-39.000.

Badger Meter Inc.: *See*—
Bradham, Allen C., III; and Seruga, Edward A., 4,175,434, Cl. 73-197.000.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See*—
Eckert, Guenter; Knaflic, France; Miller, Franz-Friedrich; and Zissel, Alfred, 4,175,922, Cl. 8-94.160.

Baer, Stephen, to Dow Corning Corporation. Self reorienting solar tracker. 4,175,391, Cl. 60-531.000.

Baert, Victor R., to Pako Corporation. Test system for photographic printers. 4,175,852, Cl. 355-35.000.

Baggett, William M.; and Plischke, LeMoyne W., to Monsanto Company. Process for incorporating CaF_2 into polyamides. 4,176,227, Cl. 528-488.000.

Bailey, Clifford E., to Bailey, Clifford E. Assembly for mounting tubeless tires. 4,175,606, Cl. 152-399.000.

Baker Perkins Holdings Limited: *See*—
Edwards, Albert, 4,175,866, Cl. 366-2.000.

Baker, Thomas E.; Fix, George L.; and Judge, John S., to Raytheon Corporation. Process for forming polymeric paraxylylene coatings and films possessing improved oxidation resistance. 4,176,209, Cl. 427-248.00B.

Baldwin, Arthur M., to Champion International Corporation. Panel turner. 4,175,655, Cl. 198-403.000.

Baldwin, John J.; and Ponticello, Gerald S., to Merck & Co., Inc. Novel naphthyridines. 4,176,183, Cl. 424-248.520.

Ball, Lawrence E.: *See*—
Aziz, Walid Y.; and Ball, Lawrence E., 4,176,095, Cl. 260-9.000.

Balsys, Heinz: *See*—
Eibofner, Eugen; and Balsys, Heinz, 4,175,323, Cl. 433-126.000.

Barbier, Pierre, to Societe d'Etudes Scientifiques et Industrielles. Pharmaceutical composition comprising erythromycin and metoclopramide and method of preparing same. 4,176,180, Cl. 424-181.000.

Bardiani, Christian: *See*—
Korner, Otto; and Bardiani, Christian, 4,175,798, Cl. 305-58.00R.

Barker, N. Glen: *See*—
Johnston, William T.; and Barker, N. Glen, 4,175,906, Cl. 414-469.000.

Barmag Barmer Maschinenfabrik Ag: *See*—
Schippers, Heinz; and Lenk, Erich, 4,175,712, Cl. 242-46.400.

Barnard, James A., to General Motors Corporation. Conveyorized fin accumulator. 4,175,309, Cl. 29-157.30R.

Barnes, Jocelyn T., to Lexalite International Corporation. Stackable light refractor. 4,175,661, Cl. 206-519.000.

Bartini, Paul S.: *See*—
Roantree, William J.; and Bartini, Paul S., 4,175,540, Cl. 126-425.000.

Barwin, Raymond K. Ski edge. 4,175,766, Cl. 280-608.000.

BASF Aktiengesellschaft: *See*—
Kast, Hellmut, 4,176,229, Cl. 542-422.000.
Platz, Rolf; Dockner, Toni; Heners, Jurgen; and Krug, Herbert, 4,176,137, Cl. 260-561.00N.
Schoettle, Klaus; Dobler, Peter; Gliniorz, Lothar; Scherer, Volker; and Brombach, Heinz, 4,175,999, Cl. 156-505.000.

BASF Wyandotte Corporation: *See*—
Demou, John G.; and Pray, Edward R., 4,176,218, Cl. 521-129.000.

Batcho, Andrew D., to Hoffmann-La Roche Inc. 5-(6-Alkylindol-3-ylmethylene)-1,3-dimethyl-2-(methylimino)-4-imidazolidinones. 4,176,230, Cl. 542-444.000.

Battard, Jean-Claude; and Buisson, Jean, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Glue for articles in the tobacco industry and method employing same. 4,175,996, Cl. 156-336.000.

Battelle Development Corporation: *See*—
Rider, Dennis G., 4,176,398, Cl. 364-607.000.

Baubel, Alexandr A.: *See*—
Sakulevich, Faddei J.; Minin, Leonid K.; Bazarnov, Jury A.; Baubel, Alexandr A.; and Skvorchevsky, Nikolai Y., 4,175,930, Cl. 51-281.00R.

Bauman, Robert S., to St. Louis Diecasting Corporation. Spring clip break-away. 4,175,724, Cl. 248-642.000.

Baumeister, Gregor: *See*—
Finkelstein, Wolfgang; Baumeister, Gregor; and Haaz, Josef, 4,175,583, Cl. 137-504.000.

Baumert, Jean, to ARBED Acieries Reunies de Burbach-Eich-Dudelange S.A. Apparatus for measuring and controlling the level of molten steel in a continuous-casting mold. 4,175,612, Cl. 164-449.000.

Baumgartner Papiers S.A.: *See*—
Roullier, Marcel-Francois, 4,175,479, Cl. 93-77.0FT.

Baxter Travenol Laboratories, Inc.: *See*—
Hess, John M., III; and Mittleman, Herbert, 4,175,558, Cl. 128-214.00C.
Norton, William W.; and Boehmer, Henry, 4,175,994, Cl. 156-251.000.

Baycura, Orestes M. Low noise gas turbine. 4,175,380, Cl. 60-39.060.

Bayer Aktiengesellschaft: *See*—
Bier, Peter; Binsack, Rudolf; and Vernaleken, Hugo, 4,176,224, Cl. 528-309.000.
Birkenstock, Udo; and Haydn, Josef, 4,176,092, Cl. 252-472.000.
Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, 4,176,181, Cl. 424-211.000.
Lenthe, Manfred; and Dankert, Gerhard, 4,176,133, Cl. 260-465.50R.
Petinaux, Marcel; Dieterich, Dieter; and Markusch, Peter, 4,176,118, Cl. 260-239.00A.

Bayer, Bryce E.: *See*—
Dillon, Peter L. P.; and Bayer, Bryce E., 4,176,373, Cl. 358-37.000.

Bayerische Motoren Werke AG: *See*—
Ederer, Georg; Fischer, Adolf; Rosche, Paul; Troll, Helmar; Wurst, Wolfgang; Hengl, Helmut; and Seidl, Jiri, 4,175,504, Cl. 123-52.00M.

Bazarnov, Jury A.: *See*—
Sakulevich, Faddei J.; Minin, Leonid K.; Bazarnov, Jury A.; Baubel, Alexandr A.; and Skvorchevsky, Nikolai Y., 4,175,930, Cl. 51-281.00R.

BBC Brown Boveri & Company Limited: *See*—
Pfenninger, Hans, 4,175,382, Cl. 60-39.18B.

Beale, Richard F.: *See*—
Morrison, William R. B.; and Beale, Richard F., 4,175,430, Cl. 73-141.00A.

Beall, Richard W., Jr.: *See*—
Tyler, Truman V., 4,176,063, Cl. 210-101.000.

Beam, Dennis A., Jr.; and Sarazen, Paul M., Jr. Wall ventilator construction. 4,175,480, Cl. 98-37.000.

Becker, Dieter; and Stenert, Alois, to Hoesch Werke Aktiengesellschaft. One-piece intermediate member for anti-friction bearings. 4,175,805, Cl. 308-199.000.

Becker, Michael L.; and Wilfong, William G., to A-T-O Inc. Case packer head. 4,175,364, Cl. 53-539.000.

Beckman Instruments, Inc.: *See*—
Blanke, John D., 4,175,427, Cl. 73-118.000.

Beckwith, Edward K. Dental articulator. 4,175,325, Cl. 433-60.000.

Beery, Jack: *See*—
Speckman, Lawrence; and Beery, Jack, 4,175,719, Cl. 242-197.000.

BEI Electronics, Inc.: *See*—
Shuffield, Thomas E., Jr., 4,176,286, Cl. 307-237.000.

Belcher, James E.: *See*—
Tachick, Henry N.; Arnold, Reginald S.; Belcher, James E.; and St. Jacques, Joseph A., 4,175,817, Cl. 339-111.000.

Bell, Frank H., to Thiokol Corporation. Gun with rapid firing rate. 4,175,470, Cl. 89-7.000.

Bell Telephone Laboratories, Incorporated: *See*—
Kasper, Horst M.; Tell, Benjamin; and Wagner, Sigurd, 4,176,170, Cl. 423-508.000.
O'Sullivan, Thomas D., 4,176,021, Cl. 204-96.000.
Rudisill, John A., Jr., 4,176,255, Cl. 179-16.00F.
Saari, Veikko R.; and Shoji, Masakazu, 4,176,344, Cl. 340-347.0DA.
Sabia, Raffaele A., 4,176,240, Cl. 174-23.00C.
Sheets, Laurence L., 4,176,248, Cl. 178-67.000.

Beloit Corporation: *See*—
Dreher, George L., 4,175,714, Cl. 242-65.000.
Sokolow, Nickolas N., 4,176,152, Cl. 264-329.000.

Bendig, Larry L.; Scamehorn, John F.; and Stowell, Donald E., to Continental Oil Company. High pore volume alumina from dilute high injection alkoxide feed. 4,176,171, Cl. 423-628.000.

Bendix Corporation, The: *See*—
Harper, Patrick D., 4,176,387, Cl. 361-154.000.
Pauwels, Edward M., 4,175,794, Cl. 303-105.000.

Benedetti, Nicholas M., to USM Corporation. Molding clip. 4,175,303, Cl. 24-73.0FT.

Benjamin, Martin E.: *See*—
Denton, Dennis N.; and Benjamin, Martin E., 4,175,756, Cl. 277-189.000.

Benjo, Cezar. Apparatus for assisting the understanding of electro-cardiography and vector-cardiography. 4,175,337, Cl. 35-17.000.

Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, to Pfizer Inc. Particle gamma ferric oxide. 4,176,172, Cl. 423-634.000.

Bennett, William G., to Teleflex Incorporated. Motion transmitting remote control assembly. 4,175,450, Cl. 74-501.00P.

Bennon, Saul; and Albright, William D., to Westinghouse Electric Corp. Magnetic core for single phase electrical inductive apparatus. 4,176,333, Cl. 336-60.000.

Bentley, Richard P. Strap closure. 4,175,304, Cl. 24-197.000.

Berglind, Bradford L., to General Motors Corporation. Time division multiplexing system for an automobile. 4,176,250, Cl. 179-1.0VE.

Bernot, Jean, to Trefilunion. Process and installation for mechanical descaling steel wire. 4,175,412, Cl. 72-40.000.

Bertelsen, William R. Surface effect vehicles and guideways therefor. 4,175,637, Cl. 180-128.000.

Bertus, Brent J.; and Walker, Darrell W., to Phillips Petroleum Company. Dehydrogenation of hydrocarbons with zinc titanate catalyst. 4,176,140, Cl. 585-629.000.

Berwick, Martin A.; Fox, Charles J.; and Light, William A., to Eastman Kodak Company. Multi-active photoconductive element having an aggregate charge generating layer. 4,175,960, Cl. 430-58.000.

Berwick, Martin A.: *See*—
Wright, Hal E.; and Berwick, Martin A., 4,175,961, Cl. 430-58.000.

Betriesbsforschungsinstitut VDEh Institut fur angewandte Forschung GmbH: *See*—
Keck, Roland, 4,175,429, Cl. 73-141.00A.

Bettcher Industries, Inc.: *See*—
Bettcher, Louis A., 4,175,321, Cl. 30-276.000.

Bettcher, Louis A., to Bettcher Industries, Inc. Trimming knife. 4,175,321, Cl. 30-276.000.

Bianchi, Maurice P.; and Rosales, Louis A., to TRW Inc. Passive lubrication method and system. 4,175,642, Cl. 184-1.00E.

Biedermann, Ernst: *See*—
Rapp, Heinz; Biedermann, Ernst; and Wittenbrink, Dieter, 4,175,857, Cl. 355-73.000.

Bier, Peter; Binsack, Rudolf; and Vernaleken, Hugo, to Bayer Aktiengesellschaft. Poly (ethylene/alkylene) terephthalates which crystallize rapidly. 4,176,224, Cl. 528-309.000.

Bieringer, Hermann: *See*—
Koch, Manfred; Handte, Reinhard; Horlein, Gerhard; Bieringer, Hermann; and Langeluddeke, Peter, 4,175,947, Cl. 71-88.000.

Biess, John J.: *See*—
Cronin, Donald L.; and Biess, John J., 4,176,392, Cl. 363-71.000.

Bigelow, Jeffrey A.: *See*—
Bigelow, Jerome J.; and Bigelow, Jeffrey A., 4,175,306, Cl. 24-253.000.

Bigelow, Jerome J.; and Bigelow, Jeffrey A., to Bigelow, Jeffrey A. Molded spring-biased garment clamp. 4,175,306, Cl. 24-253.000.

Bignold, Alan J.: *See*—
Cruden, John M.; Bignold, Alan J.; Green, Roger H.; and Grisenthwaite, Ronald J., 4,176,103, Cl. 260-29.6RW.

Bimond, Jean-Pierre; and Lazarre, Flavien, to Societe Nationale Elf Aquitaine (Production). Device for handling and testing a cell adapted for sampling a pressurized fluid. 4,175,424, Cl. 73-49.200.

Bingen, Roald, to Ateliers de Constructions Electriques de Charleroi (ACEC). Four a induction. 4,176,237, Cl. 13-27.000.

Binsack, Rudolf: *See*—
Bier, Peter; Binsack, Rudolf; and Vernaleken, Hugo, 4,176,224, Cl. 528-309.000.

Birch, Stanley F.; Lawler, John A.; and Paynter, Gerald C., to Boeing Commercial Airplane Company. Vortex generators for internal mixing in a turbofan engine. 4,175,640, Cl. 181-213.000.

Birkenhead, Stuart I.: *See*—
Ashdown, Ronald A.; Ewing, Keith; and Birkenhead, Stuart I., 4,175,582, Cl. 137-334.000.

Birkenstock, Udo; and Haydn, Josef, to Bayer Aktiengesellschaft. Process for the depyrophorization of pyrophoric metal catalysts and catalysts prepared by the process. 4,176,092, Cl. 252-472.000.

Bischeri, Ido. Plunge-grinder, especially for grinding the cams of engine timing shafts. 4,175,358, Cl. 51-142.000.

Bishop, Donald E.: *See*—
Lough, Wendell J.; and Bishop, Donald E., 4,175,936, Cl. 55-385.00A.

Bishop, Leonard W. J.: *See*—
Russell, Stuart M.; and Bishop, Leonard W. J., 4,176,174, Cl. 424-8.000.

Black, Dennis A.; and Mantey, Raymond N., to General Motors Corporation; and General Motors Corporation. Drive shaft lug for variable displacement compressor. 4,175,915, Cl. 417-222.000.

Black, Donald S., to Palmer Engineering Company Ltd. Mixture concentrator. 4,176,064, Cl. 210-196.000.

Blaha, Erich; and Schulz, Kurt, to Zeiss-Stiftung, Carl. Adjustable viewing head for a stereoscopic microscope. 4,175,826, Cl. 350-36.000.

Blair, Lloyd S., to General Electric Company. Pipe header–cylindrical tank joint and method of joining same. 4,175,615, Cl. 165-106.000.

Blanke, John D., to Beckman Instruments, Inc. Engine fault analysis on catalytic converter equipped autos. 4,175,427, Cl. 73-118.000.

Blondelot, Emile; Economopoulos, Marios; and Wilmotte, Stephan H., to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie; and ARBED Acieries Reunies de Burbach-Eich-Dudelange S.A. Method of producing steel sections of improved quality. 4,175,985, Cl. 148-12.400.

Blurton, Claire M.: *See*—
Jeppson, Morris R., 4,175,885, Cl. 404-77.000.

Blurton, Richard R.: *See*—
Jeppson, Morris R., 4,175,885, Cl. 404-77.000.

Bobst-Champlain, Inc.: *See*—
Stern, Nathan, 4,176,162, Cl. 423-210.000.

Bochumer Eisenhutte Heintzmann GmbH & Co.: *See*—
von Klinggraff, Gerhard; Marr, Peter; and Bohnes, Karlheinz, 4,175,891, Cl. 405-291.000.

Bodenseewerk Perkin-Elmer & Co. GmbH: *See*—
Tamm, Rolf G.; Grosser, Gunter; and Tomoff, Toma, 4,175,863, Cl. 356-312.000.

Boehme, Detlef R., to Varian Associates, Inc. Pressure regulator with minimum dead volume. 4,175,585, Cl. 137-509.000.

Boehmer, Henry: *See*—
Norton, William W.; and Boehmer, Henry, 4,175,994, Cl. 156-251.000.

Boehringer Ingelheim GmbH: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Goldberg, Leon I.; Merz, Herbert; and Stockhaus, Klaus, 4,176,186, Cl. 424-260.000.
Boeing Commercial Airplane Company: *See—*
Birch, Stanley F.; Lawler, John A.; and Paynter, Gerald C., 4,175,640, Cl. 181-213.000.
Boeing Company, The: *See—*
Lang, John M., 4,175,656, Cl. 198-748.000.
Boggs, Roger L.; and Christensen, Jon C., to Caterpillar Tractor Co. Track-type vehicle wheel cleaning apparatus. 4,175,796, Cl. 305-11.000.
Bohnes, Karlheinz: *See—*
von Klinggraff, Gerhard; Marr, Peter; and Bohnes, Karlheinz, 4,175,891, Cl. 405-291.000.
Bolen, Charles E.: *See—*
Marzocchi, Alfred; Roberts, Michael G.; and Bolen, Charles E., 4,175,978, Cl. 106-281.00R.
Boliden Aktiebolag: *See—*
Fahlstrom, Per A. H. H., 4,176,042, Cl. 208-11.0LE.
Lagerstrom, Gosta B., 4,176,203, Cl. 426-636.000.
Bollwitt, Duaine L.: *See—*
Steffen, Sylvester L.; and Bollwitt, Duaine L., 4,175,418, Cl. 73-342.000.
Bonner, Cletus D. Tamper proof security mail and bank collection bag. 4,175,604, Cl. 150-15.000.
Booth, W. Jesse. Apparatus for dynamically testing golf clubs. 4,175,440, Cl. 73-432.0SD.
Borg-Warner Corporation: *See—*
Wentworth, Robert S., Jr., 4,175,753, Cl. 277-87.000.
Boruszewski, John S.: *See—*
Hay, Robert A., II; and Boruszewski, John S., 4,175,998, Cl. 156-391.000.
Bott, John A. Luggage rack. 4,175,682, Cl. 224-309.000.
Bouet, Jacques E., to International Harvester Company. Device for fixing the knives of rotary mowers. 4,175,367, Cl. 56-295.000.
Bova, Mary L.; and Bova, Ralph G. Apparatus and method for producing sectioned edibles. 4,175,690, Cl. 227-76.000.
Bova, Ralph G.: *See—*
Bova, Mary L.; and Bova, Ralph G., 4,175,690, Cl. 227-76.000.
Boyd, John A. Toilet construction. 4,175,294, Cl. 4-237.000.
Boyd, William R. Snap ring tool. 4,175,310, Cl. 29-229.000.
BPB Industries Limited: *See—*
George, James S.; Ward, Arthur G. T.; and Pastakia, Percy N., 4,176,157, Cl. 422-114.000.
Brack, Karl, to Design Cote Corporation. Radiation and moisture curable compositions and method of use. 4,176,212, Cl. 428-423.000.
Bradham, Allen C., III; and Seruga, Edward A., to Badger Meter Inc. Compound meter assembly. 4,175,434, Cl. 73-197.000.
Bradley, Kenneth M. Sanitary unit for confined environmental controlled feeding of hogs. 4,175,515, Cl. 119-16.000.
Bradley, Terry G.: *See—*
Manning, Walter; and Bradley, Terry G., 4,175,449, Cl. 74-492.000.
Brainman, Felix A.: *See—*
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.
Branch, Andrew J.: *See—*
Crowninshield, Roy D.; and Branch, Andrew J., 4,175,446, Cl. 73-787.000.
Brandau, Steven G.; and Carmichael, Robert L., to Deere & Company. Gas-contaminant separator. 4,175,937, Cl. 55-419.000.
Brauer, Melvin; and Kroplinski, Thaddeus F., to N L Industries, Inc. Insulated electrical cable containing an agent for decontaminating and sealing the interior space thereof. 4,176,239, Cl. 174-23.00C.
Braukmann Armaturen AG: *See—*
Braukmann, Bernhard W., 4,175,696, Cl. 236-34.500.
Braukmann, Bernhard W., to Braukmann Armaturen AG. Thermostatic valve. 4,175,696, Cl. 236-34.500.
Braun, Clarence; and Zupanick, Joseph E., to Sun Oil Company (Delaware). Apparatus for determining the pulse repetition rate of a fluidic oscillator through which a test gas is flowing. 4,175,423, Cl. 73-30.000.
Brede, Uwe: *See—*
Knappworst, Jurgen; Brede, Uwe; and Zeiher, Erich, 4,175,492, Cl. 102-92.600.
Brenzel, Daniel J., to Dynapol. Process for preparing ethylidene-bisacetamide. 4,176,136, Cl. 260-561.00R.
Breznay, Endre. Process for perishing waste rubber materials, especially worn out motor vehicle rubber tires by recovering their components for industrial purposes. 4,175,949, Cl. 75-42.000.
Bricot, Claude; Dubois, Jean-Claude; LeCarvennec, Francois; Lehureau, Jean-Claude; and Magna, Henriette, to Thomson-Brandt. Thermosensitive data-carrier designed for the recording of information and a method of recording information on such a data-carrier. 4,176,277, Cl. 250-316.100.
Bringman, Bernard B.; and Goodwin, Genevieve M. Stocking mending apparatus. 4,176,001, Cl. 156-581.000.
Brinkert, Franz, to Raco-Elektro-Maschinen GmbH. Electrically resettable railway brake. 4,175,645, Cl. 188-72.100.
Bristol-Myers Company: *See—*
Shih, Kun M.; and Walker, Derek, 4,176,131, Cl. 260-448.20E.
British Steel Corporation: *See—*
Owen, Leslie J., 4,175,422, Cl. 73-23.000.
British Steel Corporation (Chemicals) Limited: *See—*
Fletcher, John M., 4,175,611, Cl. 164-418.000.
Britton, Keith C.; and Lekas, Mitchell A., to Geokinetics Inc. Process for producing an underground zone of fragmented and pervious material. 4,175,490, Cl. 102-23.000.
Britton, Michael W.; Harlacher, Eugene A.; Dew, John N.; and Kleinpeter, Joseph A., to Conoco Methanation Company. Hydrodesulfurization purification process for coal gasification. 4,175,928, Cl. 48-197.00R.
Britton, Michael W.: *See—*
Dew, John N.; Britton, Michael W.; Harlacher, Eugene A.; and Kleinpeter, Joseph A., 4,176,087, Cl. 252-439.000.
Brois, Stanley J.: *See—*
Ryer, Jack; Winans, Esther D.; Brois, Stanley J.; and Gutierre, Antonio, 4,176,073, Cl. 252-32.70E.
Brombach, Heinz: *See—*
Schoettle, Klaus; Dobler, Peter; Gliniorz, Lothar; Scherer, Volker; and Brombach, Heinz, 4,175,999, Cl. 156-505.000.
Bromley, James E.; and Yu, Jing-Peir, to Monsanto Company. Process for textured yarn. 4,176,150, Cl. 264-168.000.
Brookfield, David A. Viscometer. 4,175,425, Cl. 73-59.000.
Brosenius, Karl H., to Tekram Associates, Inc. Method and apparatus for conservation of energy in a hot water heating system. 4,175,698, Cl. 237-19.000.
Broughton, Jacksel M. Heavy lift air cushion amphibious vehicle. 4,175,636, Cl. 180-119.000.
Broun, Thorowgood T.: *See—*
Hargett, William D.; and Broun, Thorowgood T., 4,176,165, Cl. 423-245.000.
Brower, Ronald W.; Cohen, Jerome; and Chen, Peter C., to NCR Corporation. Method for enhancing the adhesion of photoresist to polysilicon. 4,176,003, Cl. 430-313.000.
Brown, Alfred: *See—*
Wu, Ching H.; Brown, Alfred; Hall, Wilbur L.; and Shupe, Russell D., 4,175,618, Cl. 166-252.000.
Brown, Kenneth H.; and Shepard, John W., to Motorola, Inc. DC coupled bi-phase modulator. 4,176,328, Cl. 332-16.00T.
Brown & Root, Inc.: *See—*
Nolan, Clyde E., Jr.; and Tillinghast, William S., 4,175,620, Cl. 166-343.000.
Bruce, Charles R.; Johnson, Irvin D.; and McGrievy, Lawrence H., to Marathon Oil Company. Apparatus and method for controlling the rate of feeding a petroleum product to a coking drum system. 4,176,052, Cl. 208-131.000.
Bruegman, Michael L.: *See—*
Pospischil, Albert R.; Bruegman, Michael L.; and Granberg, Erlang W., 4,175,989, Cl. 194-1.00C.
Bruneel, Jean-Luc: *See—*
Micheron, Francois; and Bruneel, Jean-Luc, 4,176,345, Cl. 340-373.000.
Brunton Company, The: *See—*
Kramer, Melvin G., 4,175,333, Cl. 33-344.000.
Bryant, Jeffrey J. Adjacent loop distillation. 4,176,012, Cl. 202-172.000.
Bubik, Alfred; and Reutter, Siegfried, to Escher Wyss GmbH. Double filter papermaking machine. 4,176,005, Cl. 162-256.000.
Buckman, John D.; Hunter, Wood E.; Pera, John D.; and Taylor, Robert M., to Buckman Laboratories, Inc. Water-soluble dispersions of high molecular water-soluble polymers containing a surfactant and a water-soluble organic carrier which is a hydroxy compound containing repeating alkylene oxide units. 4,176,107, Cl. 260-29.60E.
Buckman Laboratories, Inc.: *See—*
Buckman, John D.; Hunter, Wood E.; Pera, John D.; and Taylor, Robert M., 4,176,107, Cl. 260-29.60E.
Buczek, Carl J.: *See—*
Wayne, Robert J.; Chenausky, Peter P.; and Buczek, Carl J., 4,176,327, Cl. 331-94.50M.
Buisson, Jean: *See—*
Battard, Jean-Claude; and Buisson, Jean, 4,175,996, Cl. 156-336.000.
Bujese, David P., to Pitney-Bowes, Inc. Control system for a reciprocating carriage drive system. 4,175,850, Cl. 355-13.000.
Bullough Limited: *See—*
White, Gordon D., 4,175,909, Cl. 415-145.000.
Bunda, Tsuchio: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Bunda, Tsuchio; and Tanaka, Taro, 4,175,523, Cl. 123-119.00A.
Bundy, Gordon L., to Upjohn Company, The. 2-Decarboxy-2-alkylcarbonyl-3,7-inter-m-phenylene-3-oxa-4,5,6-trinor-PGF_1 compounds. 4,176,282, Cl. 260-590.00C.
Bunker Ramo Corporation: *See—*
Nijman, John P., 4,175,320, Cl. 29-749.000.
Bunyan, Thomas W., to Pilgrim Engineering Developments Limited. Joints. 4,175,311, Cl. 29-402.180.
Burgess, James V., Jr., to Mine Ventilation Systems, Inc. Mine ventilation system and elements thereof. 4,175,481, Cl. 98-50.000.
Burian, Paul D., to Clairol Incorporated. Manicure attachment. 4,175,573, Cl. 132-73.600.
Buritz, Robert S.; Parker, Robert D.; Kisch, Jack J.; and Burnham, John, to Hughes Aircraft Company. High voltage transformer and process for making same. 4,176,334, Cl. 336-84.00C.
Burlington Industries, Inc.: *See—*
Crawford, William B.; Daniel, Vernon T.; and Wang, Kenneth Y., 4,175,436, Cl. 73-338.600.
Burnham, John: *See—*
Buritz, Robert S.; Parker, Robert D.; Kisch, Jack J.; and Burnham, John, 4,176,334, Cl. 336-84.00C.
Burov, Lev A.: *See—*
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.;

Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.
Burr, Robert P.; Morino, Ronald; and Keogh, Raymond J., to Kollmorgen Technologies Corporation. Multi-wire electrical interconnecting member having a multi-wire matrix of insulated wires mechanically terminated thereon. 4,175,816, Cl. 339-95.00R.
Burroughs Corporation: *See—*
Charpentier, Douglass E., 4,176,335, Cl. 336-180.000.
Ferguson, Thomas R., 4,175,728, Cl. 269-91.000.
Speckman, Lawrence; and Beery, Jack, 4,175,719, Cl. 242-197.000.
Burroughs, H. Willard. Tubing reamer. 4,175,895, Cl. 408-228.000.
Burroughs Wellcome Co.: *See—*
Russell, Stuart M.; and Bishop, Leonard W. J., 4,176,174, Cl. 424-8.000.
Burrs, Emil D.: *See—*
Johnson, Ralph W.; Burrs, Emil D.; Smith, Gary L.; Freund, Ronald G.; and Patula, Edward, 4,175,674, Cl. 221-88.000.
Burt, Dennis W. Fire, temperature or heat detector. 4,175,437, Cl. 73-362.0AR.
Burton, John S.: *See—*
Turner, William C.; Limburg, William R.; and Burton, John S., 4,175,855, Cl. 355-68.000.
Butler, James K. Mechanical glass knife scorer/breaker. 4,175,684, Cl. 225-2.000.
C. A. Weidmuller KG: *See—*
Wilmes, Manfred; Finger, Torsten; Fitzler, Arno; Kretzschmar, Wolfgang; and Franke, Heinrich, 4,175,820, Cl. 339-198.00R.
C L Industries, Inc.: *See—*
Stewart, Patrick H.; and Woodson, Wayne D., 4,176,114, Cl. 260-42.290.
Cabral, Tony: *See—*
Souza, Frank F.; Silva, Vernon A.; and Cabral, Tony, 4,175,514, Cl. 119-14.080.
Caimi, Ronald J.; and Schlauch, Walter F., to National Starch and Chemical Corporation. Heat-coagulable latex binders and process for the preparation thereof. 4,176,108, Cl. 260-29.6TA.
Cambria Spring Company: *See—*
Lampert, Albert J., 4,175,772, Cl. 280-718.000.
Cameron, Robert L. Water saving toilet. 4,175,295, Cl. 4-327.000.
Camp International, Inc.: *See—*
Rosenberg, Henry W., 4,175,553, Cl. 128-78.000.
Campbell Soup Company: *See—*
Hildebolt, William M.; and Hundt, Murray T., 4,175,486, Cl. 99-483.000.
Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources: *See—*
Ternan, Marten; and Parsons, Basil I., 4,176,051, Cl. 208-112.000.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Thistle, William G.; and Dionne, Joseph G. G., 4,176,297, Cl. 315-150.000.
Ward, Frederick D., 4,175,451, Cl. 74-661.000.
Canadian General Electric Company Limited: *See—*
Sack, Stanley F., 4,175,593, Cl. 138-110.000.
Canals, Charles: *See—*
Letournoux, Alain; and Canals, Charles, 4,175,301, Cl. 16-146.000.
Canon Kabushiki Kaisha: *See—*
Ito, Masaharu, 4,175,831, Cl. 350-255.000.
Iwashita, Tomonori; Takimoto, Hiroyuki; Mashimo, Yukio; and Hashimoto, Teiji, 4,175,845, Cl. 354-173.000.
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,175,851, Cl. 355-14.00R.
Murakami, Hiroyashu; Ito, Tadashi; Ito, Fumio; Sakurada, Nobuaki; Kawamura, Masaharu; and Shinoda, Nobuhiko, 4,175,848, Cl. 354-289.000.
Sakurada, Nobuaki; Ito, Tadashi; Shinoda, Nobuhiko; Ito, Fumio; Murakami, Hiroyashu; and Kawamura, Masaharu, 4,175,842, Cl. 354-23.00D.
Carella, Richard F. Combination of a bow and a power handle. 4,175,536, Cl. 124-23.00R.
Carl Canzler, Firma: *See—*
Kranz, Berthold, 4,175,730, Cl. 266-120.000.
Carl Still, Firma: *See—*
Knappstein, Johannes, 4,176,011, Cl. 201-40.000.
Carl Zeiss-Stiftung: *See—*
Herzog, Klaus, 4,175,327, Cl. 33-1.00M.
Muller, Ortwin; Grunvogel, Karl; and Schulz, Kurt, 4,175,839, Cl. 351-14.000.
Carman, Justice N., to Pennish, John S., as part interest. Process for producing liquid silicon. 4,176,166, Cl. 423-350.000.
Carmichael, Robert L.: *See—*
Brandau, Steven G.; and Carmichael, Robert L., 4,175,937, Cl. 55-419.000.
Carrier Corporation: *See—*
Geary, Carl H., 4,175,755, Cl. 277-137.000.
Hile, James R., 4,175,402, Cl. 62-263.000.
Carson, William S. Pick-up apparatus and containing assembly. 4,175,903, Cl. 414-408.000.
Carter, Cecil O., to Phillips Petroleum Company. Catalyst preparation. 4,176,086, Cl. 252-429.00B.
Carver, Robert G., to Creative Cartons of Ashland, Inc. Collapsible stereoscopic viewer. 4,175,828, Cl. 350-140.000.
Cassanelli, Ernest M.: *See—*
Vergnani, Leo H.; Ferrero, John B.; and Cassanelli, Ernest M., 4,175,417, Cl. 72-356.000.
Castanie, Francis: *See—*
Hoffmann, Jean-Claude; Castanie, Francis; Crabere, Henri; Verdier, Jean-Pierre; and Voisin, Norbert, 4,176,399, Cl. 364-717.000.
Catallo, Frank. Horizontal folder with varying speed traverse. 4,175,738, Cl. 270-30.000.
Caterpillar Tractor Co.: *See—*
Boggs, Roger L.; and Christensen, Jon C., 4,175,796, Cl. 305-11.000.
Coil, Donald A.; Johnson, John L., Jr.; and Swinland, Horace J., 4,175,801, Cl. 308-23.000.
Davis, Billy J.; Kinsey, Cletus M.; Shen, Hwa J.; and Weber, James R., 4,175,799, Cl. 308-9.000.
Frantzreb, John G., Sr., 4,175,918, Cl. 428-567.000.
Grawey, Charles E., 4,175,992, Cl. 156-143.000.
Holl, Harold H.; and Hupe, Walter R., 4,175,671, Cl. 220-235.000.
Knell, Harvey A.; and Gill, Stephen H., 4,175,907, Cl. 414-715.000.
Cathala, Annie: *See—*
Faron, Robert; and Cathala, Annie, 4,176,018, Cl. 204-60.000.
Catlett, Richard E. Spring powered, portable, hand held suction and blower apparatus. 4,175,352, Cl. 43-139.000.
Cattano, John D., to Dale Products, Inc. Battery strap and post cast-on multi use mold. 4,175,725, Cl. 249-81.000.
Cavalaris, Michael T.; and Spanondis, Michael E. Bag holder and dispenser. 4,175,602, Cl. 150-3.000.
CBS Inc.: *See—*
Schmoll, George F., III, 4,175,465, Cl. 84-1.260.
Celanese Polymer Specialties Company: *See—*
Shimp, David A., 4,176,221, Cl. 528-103.000.
Cella, James A., to General Electric Company. Moisture curable organopolysiloxanes. 4,176,111, Cl. 260-37.0SB.
Cella, James A.; and Mitchell, Tyrone D., to General Electric Company. Moisture curable alkoxy organopolysiloxanes. 4,176,112, Cl. 260-37.0SB.
Cella, John A.; and Fiebig, August E., Jr., to Alberto-Culver Company. Hair shampoo and cleanser compositions. 4,176,176, Cl. 424-70.000.
Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie: *See—*
Blondelot, Emile; Economopoulos, Marios; and Wilmotte, Stephan H., 4,175,985, Cl. 148-12.400.
Centro-Maskin Goteborg AB: *See—*
Johansson, Bengt A., 4,175,984, Cl. 148-9.500.
Cerberus AG: *See—*
Horvath, Zoltan; and Tresch, Erwin, 4,175,865, Cl. 356-338.000.
Certain-Teed Corporation: *See—*
Miedaner, Patrick M., 4,176,105, Cl. 260-29.300.
Cessna Aircraft Company, The: *See—*
Unruh, Dennis R.; and Martin, Robert J., 4,175,914, Cl. 417-218.000.
CGEE Alsthom: *See—*
Debaigt, Jean, 4,175,822, Cl. 339-266.00R.
Chadwick, Alexander; Khair, Magdi K.; and McCombie, Jay C., to Chrysler Corporation. Fuel injection system and control valve for multi-cylinder engines. 4,175,587, Cl. 137-625.650.
Chaffee, David H.; and Tipler, Earl L., to Overly, Inc,. Fluid bearing supporting system for rotary drums and the like. 4,175,800, Cl. 308-9.000.
Champion International Corporation: *See—*
Baldwin, Arthur M., 4,175,655, Cl. 198-403.000.
Cornell, William F.; Vear, John P.; and Pascuzzi, E. Anthony, 4,175,691, Cl. 229-36.000.
Hartman, Seymour; and Sheridan, Catherine M., 4,176,115, Cl. 260-39.00R.
Chang, Christopher T. M.: *See—*
Dimyan, Magid Y.; Hubbell, Wayne C.; Chang, Christopher T. M.; and Linn, John C., 4,176,404, Cl. 365-12.000.
Chantry, Peter J.: *See—*
Chen, Cheng-Lin; and Chantry, Peter J., 4,176,025, Cl. 204-157.10R.
Charbonnier, Simon: *See—*
Mathiolon, Henri; and Charbonnier, Simon, 4,175,717, Cl. 242-131.000.
Chari, Madabushi V. K.: *See—*
Kalsi, Swarn S.; and Chari, Madabushi V. K., 4,176,292, Cl. 310-52.000.
Charles Stark Draper Laboratory, Inc., The: *See—*
Howatt, John R., 4,176,396, Cl. 364-551.000.
Charpentier, Douglass E., to Burroughs Corporation. Electrical conducting apparatus. 4,176,335, Cl. 336-180.000.
Chemie Linz Aktiengesellschaft: *See—*
Golser, Leopold; Czepel, Hubert; and Stern, Gernard, 4,176,217, Cl. 521-106.000.
Chen, Cheng-Lin; and Chantry, Peter J., to Westinghouse Electric Corp. Isotope dissociation selective electron attachment and separation. 4,176,025, Cl. 204-157.10R.
Chen, Nai Y.; Garwood, William E.; and Peters, Alan W., to Mobil Oil Corporation. Production of high V.I. lubricating oil stock. 4,176,050, Cl. 208-111.000.
Chen, Peter C.: *See—*
Brower, Ronald W.; Cohen, Jerome; and Chen, Peter C., 4,176,003, Cl. 430-313.000.
Chen, Robert H. K.: *See—*
Kanojia, Ramesh M.; Wachter, Michael P.; and Chen, Robert H. K., 4,176,188, Cl. 424-270.000.

Chenausky, Peter P.: *See*—
Wayne, Robert J.; Chenausky, Peter P.; and Buczek, Carl J., 4,176,327, Cl. 331-94.50M.
Cheng, Shui-Shan. Assembly structure of tenon and mortise. 4,175,884, Cl. 403-353.000.
Chestnut, Scott R.: *See*—
Rugheimer, Norman M.; and Chestnut, Scott R., 4,175,750, Cl. 273-157.00R.
Chi Rho Corporation: *See*—
Llewellyn, Link W., 4,175,744, Cl. 273-26.00E.
Chiarenza, Angelo R.; and Weiss, Charles M., to Oratronics, Inc. Method and apparatus for stimulating osteogenic activity in bone structure adjacent a dental implant. 4,175,565, Cl. 433-32.000.
Childress, Donnie D., to Desal-Chem, Inc. Delsalinization and chemical extraction process. 4,176,023, Cl. 204-98.000.
Chinoin Gyogyszer es Vegyeszeti Termekek: *See*—
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.
Chlorine Engineers Corp., Ltd.: *See*—
Goto, Nobutaka, 4,176,168, Cl. 423-478.000.
Chow, Kung C., to Westinghouse Electric Corp. Overcurrent relay. 4,176,386, Cl. 361-93.000.
Christensen, Jon C.: *See*—
Boggs, Roger L.; and Christensen, Jon C., 4,175,796, Cl. 305-11.000.
Christensen, Robert F., to J. I. Case Company. Electronically controlled four-wheel steering. 4,175,638, Cl. 180-140.000.
Chrysler Corporation: *See*—
Chadwick, Alexander; Khair, Magdi K.; and McCombie, Jay C., 4,175,587, Cl. 137-625.650.
Coddington, Thomas T., 4,175,524, Cl. 123-122.00D.
Chu, Cheng-Hsien: *See*—
Stark, William H.; and Chu, Cheng-Hsien, 4,176,164, Cl. 423-243.000.
Chubb, Talbot A. Method of storing energy. 4,175,613, Cl. 165-1.000.
Churlaud, Henri A., to Societe Anonyme des Etablissements Ph. Bonvillan & E. Ronceray. Mixer for different products and in particular for foundry sands. 4,175,869, Cl. 366-42.000.
Ciba-Geigy Corporation: *See*—
Darms, Roland; Wyler, Siegfried; and Greber, Gerd, 4,176,124, Cl. 260-346.300.
Habicht, Ernst, 4,176,190, Cl. 424-274.000.
Robertson, George H.; and Stirling, John A., 4,175,979, Cl. 106-309.000.
Sury, Yel S.; and Guillory, Melvin J., Jr., 4,176,060, Cl. 210-62.000.
Wick, Arnold; and Jost, Max, 4,176,113, Cl. 260-40.00P.
Cicci, George B., to International Harvester Company. Harvester lift and float mechanism. 4,175,366, Cl. 56-15.800.
Cincinnati Milacron-Heald Corporation: *See*—
Knorring, Richard T., 4,175,415, Cl. 72-101.000.
Cincinnati Mine Machinery Company, The: *See*—
Krekeler, Claude B., 4,175,797, Cl. 305-53.000.
Cinderey, Michael B.; and Rose, John B., to Imperial Chemical Industries Limited. Production of aromatic polyethers. 4,176,222, Cl. 528-126.000.
Cindu Chemie B.V.: *See*—
van Eijk, Johannes N., 4,176,043, Cl. 208-44.000.
Citizen Watch Co. Ltd.: *See*—
Ichikawa, Singo, 4,175,377, Cl. 58-23.0BA.
Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Ohno, Hideshi; and Natori, Minoru, 4,175,372, Cl. 58-5.000.
Clairol Incorporated: *See*—
Burian, Paul D., 4,175,573, Cl. 132-73.600.
Clark, Alan C.: *See*—
Surbey, Donald L.; Clark, Alan C.; and Miller, Leonard E., 4,176,081, Cl. 252-182.000.
Clark, Robert H., to McGraw-Edison Company. Donut maker appliance with improved means for coating batter with cooking oil. 4,175,483, Cl. 99-354.000.
Clarke, Charles W., to Ederer Incorporated. Single failure proof crane. 4,175,727, Cl. 254-173.00R.
Clay, B. Jan: *See*—
Durr, Larry J.; Durr, Larry L.; and Clay, B. Jan, 4,175,932, Cl. 55-59.000.
Clegg, Maurice A.: *See*—
Ruscoe, Michael J. H.; Clegg, Maurice A.; Seibt, Willie H.; and Sarkar, Kshitindra M., 4,176,014, Cl. 204-23.000.
Clemar Manufacturing Corporation: *See*—
Evelyn-Veere, Rene H.; and Ruggles, Richard L., 4,176,395, Cl. 364-420.000.
Clement, Jean-Claude: *See*—
Sturtz, Georges; and Clement, Jean-Claude, 4,176,225, Cl. 528-337.000.
Clemmons, Quenten T., to Westinghouse Air Brake Company. Parking brake control system for railway vehicles. 4,175,793, Cl. 303-89.000.
Coal Industry (Patents) Limited: *See*—
James, Granville C., 4,175,933, Cl. 55-259.000.
Monks, Harry, 4,175,649, Cl. 192-18.00A.
Coddington, Thomas T., to Chrysler Corporation. Inlet air temperature control for automobile engine. 4,175,524, Cl. 123-122.00D.
Coded Communications: *See*—
Tobin, Joseph J.; Robinson, David B.; Peay, Robert L.; Powell, Jerry R.; and Gay, Leslie W., 4,176,348, Cl. 340-562.000.
Cohen, Izak (Piet), to Sales Promotion Spits B.V. Viewer for the successive viewing of a number of transparent images. 4,175,344, Cl. 40-364.000.
Cohen, Jerome: *See*—
Brower, Ronald W.; Cohen, Jerome; and Chen, Peter C., 4,176,003, Cl. 430-313.000.
Cohen, Milton J. Non-aerosol continuous spray dispenser. 4,175,704, Cl. 239-320.000.
Coil, Donald A.; Johnson, John L., Jr.; and Swinland, Horace J., to Caterpillar Tractor Co. Bearing having a tab. 4,175,801, Cl. 308-23.000.
Coldren, Daniel R.; Krider, Paul R.; and Williams, Benjamin C., to AMP Incorporated. Connector having snubber network for triac. 4,175,811, Cl. 339-19.000.
Colglazier, Donald F.; Fallon, John L.; Kimble, George P.; and Mares, Fred R., to International Business Machines Corporation. Cut-sheet xerographic copier having combing wheel sheet feed and a duplex bin with an adjustable bottom-of-the-bin pad. 4,175,741, Cl. 271-3.100.
Collum, Paulette: *See*—
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,176,178, Cl. 424-180.000.
Combustion Engineering, Inc.: *See*—
Mabery, Thomas L., 4,175,419, Cl. 72-383.000.
Nelson, Hugh W., 4,176,163, Cl. 423-242.000.
Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme): *See*—
Donabin, Claude J., 4,175,694, Cl. 235-475.000.
Compton, James B., to National Semiconductor Corporation. Junction field effect transistor for use in integrated circuits. 4,176,368, Cl. 357-22.000.
Conner, William R., Jr., to Kellwood Company. Suspension system for land vehicles. 4,175,763, Cl. 280-104.000.
Conoco, Inc.: *See*—
McConaghy, James R., Jr., 4,176,046, Cl. 208-50.000.
Conoco Methanation Company: *See*—
Britton, Michael W.; Harlacher, Eugene A.; Dew, John N.; and Kleinpeter, Joseph A., 4,175,928, Cl. 48-197.00R.
Dew, John N.; Britton, Michael W.; Harlacher, Eugene A.; and Kleinpeter, Joseph A., 4,176,087, Cl. 252-439.000.
Container Corporation of America: *See*—
Fraenkel, Stephen J., 4,175,709, Cl. 241-21.000.
Continental Oil Company: *See*—
Bendig, Larry L.; Scamehorn, John F.; and Stowell, Donald E., 4,176,171, Cl. 423-628.000.
Orrell, Derrell D.; and McFeeters, Melvin M., 4,176,047, Cl. 208-51.000.
Cook, George E.: *See*—
Merrick, George J.; Cook, George E.; and Modglin, Donald D., 4,176,269, Cl. 219-60.00A.
Cook, Marvin K., to MacAndrews and Forbes Company. Sweetening composition. 4,176,201, Cl. 426-548.000.
Cook, Robert J. Magnetic filter. 4,176,065, Cl. 210-223.000.
Coone, Malcolm G., to Lynes, Inc. Tubular member seal enclosing and enclosure releasing apparatus. 4,175,592, Cl. 138-89.000.
Copal Company Limited: *See*—
Hasebe, Sukehiro; and Oyamada, Masanao, 4,175,376, Cl. 58-23.00R.
Corfield, John R.; and Taylor, Clifford G., to Lilly Industries Limited. Process for preparing 3-exomethylenecepham sulfoxides. 4,176,231, Cl. 544-16.000.
Cormier, Richard A.; and Gagnon, Claude F., to Redpath Sugars Limited. Enzyme immobilization with a disulphide bridge. 4,176,006, Cl. 435-74.000.
Cornell, Charles R.; and Simpson, Dennis D., to Eaton Corporation. Steering control system for dual path hydrostatic vehicle. 4,175,628, Cl. 180-6.480.
Cornell, William F.; Vear, John P.; and Pascuzzi, E. Anthony, to Champion International Corporation. Stackable carton for perishable commodities. 4,175,691, Cl. 229-36.000.
Corning Glass Works: *See*—
Lipp, George D., 4,175,942, Cl. 65-60.00B.
Corns, Joseph B.; Nevitt, Thomas D.; and Hertwig, Waldemar R., to Standard Oil Company (Indiana). Process for conversion of heavy hydrocarbons. 4,176,048, Cl. 208-59.000.
Corrigan, Patrick, to Newell Dunford Engineering Limited. Rotary air classifier. 4,176,055, Cl. 209-152.000.
Cotten, Roger C. Apparatus for forming integral tubing and washer. 4,175,917, Cl. 425-142.000.
Council, James M., to Exxon Production Research Company. Anode clamp assembly and method of installation. 4,176,033, Cl. 204-197.000.
Coupland, Keith; Salva, Juan M.; and Smith, Clinton R., to Exxon Research & Engineering Co. Molybdenum complexes of ashless oxazoline dispersants as friction reducing antiwear additives for lubricating oils. 4,176,074, Cl. 252-32.70E.
Coupland, Keith: *See*—
Alexander, A. Gordon; and Coupland, Keith, 4,176,075, Cl. 252-42.100.
Crabere, Henri: *See*—
Hoffmann, Jean-Claude; Castanie, Francis; Crabere, Henri; Verdier, Jean-Pierre; and Voisin, Norbert, 4,176,399, Cl. 364-717.000.
Crafco, Inc.: *See*—
Jacobson, Carl C.; and Crosby, Gaius P., 4,175,788, Cl. 299-1.000.

Craig, W. Dale, to United States of America, Navy. Retainer/release mechanism for use on fin stabilized gun fired projectiles. 4,175,720, Cl. 244-3.280.

Crane, John L.; Archdale, Robert W.; and Webb, Alan E., to Rolls-Royce Limited. Axial flow gas turbine engine compressor. 4,175,912, Cl. 416-193.00A.

Crawford, David R.: *See—*
Scheier, Donald J.; Crawford, David R.; and McDonald, David M., 4,175,302, Cl. 17-11.10R.

Crawford, William B.; Daniel, Vernon T.; and Wang, Kenneth Y., to Burlington Industries, Inc. Wet/dry bulb hygrometer with automatic wick feed. 4,175,436, Cl. 73-338.600.

Creative Cartons of Ashland, Inc.: *See—*
Carver, Robert G., 4,175,828, Cl. 350-140.000.

Credner, Hans-Heinrich; and Schranz, Karl-Wilhelm, to AGFA-Gevaert, A.G. Color photographic materials containing anti-fogging agents. 4,175,968, Cl. 430-559.000.

Cresswell, Don E. Fail-safe stack damper control system. 4,175,695, Cl. 236-1.00G.

Crisafulli, Angelo J. Pump with steep-angle hitch and universal drive joint. 4,175,916, Cl. 417-231.000.

Crivello, James V., to General Electric Company. Method of exposing and curing an epoxy composition containing an aromatic onium salt. 4,175,963, Cl. 430-296.000.

Crivello, James V., to General Electric Company. Curable epoxy compositions containing aromatic onium salts and hydroxy compounds. 4,175,972, Cl. 204-159.180.

Crivello, James V., to General Electric Company. Curable compositions. 4,175,973, Cl. 204-159.140.

Crom, Carol L.; and Crom, Elizabeth J. Electrical odometer. 4,176,397, Cl. 364-561.000.

Crom, Elizabeth J.: *See—*
Crom, Carol L.; and Crom, Elizabeth J., 4,176,397, Cl. 364-561.000.

Cronin, Donald L.; and Biess, John J., to United States of America, Army. Series induction/parallel inverter power stage and power staging method for DC-DC power converter. 4,176,392, Cl. 363-71.000.

Crosby, Gaius P.: *See—*
Jacobson, Carl C.; and Crosby, Gaius P., 4,175,788, Cl. 299-1.000.

Crouch, Robert L., to Early California Industries, Inc. Corrosion inhibitor mixture for ammonium sulfate fire-retardant compositions and method for inhibiting corrosivity of such compositions. 4,176,071, Cl. 252-8.100.

Crowley, John L.: *See—*
Lagos, Costas C.; Lanio, Ricardo A.; Crowley, John L.; and Moreau, Norman A., 4,175,941, Cl. 65-60.00B.

Crowninshield, Roy D.; and Branch, Andrew J., to University of Iowa Research Foundation, The. Step counting device and method. 4,175,446, Cl. 73-787.000.

Cruden, John M.; Bignold, Alan J.; Green, Roger H.; and Grisenthwaite, Ronald J., to Harlow Chemical Company Limited. Polymer latices. 4,176,103, Cl. 260-29.6RW.

Culbertson, Charles L.: *See—*
Kranich, Joel H.; Adam, Robert A.; and Culbertson, Charles L., 4,175,807, Cl. 312-118.000.

Cull, Neville L., to Exxon Research & Engineering Co. Process for the preparation of silica-titania and catalysts comprising the same. 4,176,089, Cl. 252-452.000.

Cuno, Hans-Hellmuth, to Siemens Aktiengesellschaft. Galvano magnetic position control system. 4,176,305, Cl. 318-653.000.

Curiger, Karl: *See—*
Gasser, Hermann; and Curiger, Karl, 4,175,371, Cl. 57-304.000.

Cushing, Donald S., to General Electric Company. Dishwasher with oscillating rotary spray arm. 4,175,575, Cl. 134-176.000.

Cushman, Robert H., to Pennwalt Corporation. Panoramic dental radiography employing intraoral radiation source and image intensifying means. 4,176,278, Cl. 250-439.00P.

CVG-Siderurgica del Orinoco, C.A.: *See—*
Rubio, Charles A., 4,175,951, Cl. 75-91.000.

Czepel, Hubert: *See—*
Golser, Leopold; Czepel, Hubert; and Stern, Gernard, 4,176,217, Cl. 521-106.000.

Dailmler-Benz Aktiengesellschaft: *See—*
Pabst, Rolf; and Jenz, Siegfried, 4,175,616, Cl. 165-107.00D.

Daily, John. Patch for muzzle loading firearms. 4,175,493, Cl. 102-93.000.

Daimler-Benz Aktiengesellschaft: *See—*
Andres, Rudolf; and Ament, Eduard, 4,175,633, Cl. 180-270.000.
Hanke, Hans, 4,175,647, Cl. 188-274.000.
Schopf, Hans-Joachim, 4,175,404, Cl. 64-9.00R.
Tiefenbacher, Eberhard, 4,175,911, Cl. 416-183.000.

Dale Products, Inc.: *See—*
Cattano, John D., 4,175,725, Cl. 249-81.000.

Daley, Nicholas G. Door viewer with barrel flange and mating lens recess. 4,175,824, Cl. 350-8.000.

Damon, Neil F.: *See—*
Holt, Richard C.; Damon, Neil F.; and Hanlon, Richard J., 4,175,810, Cl. 339-17.00C.

Daniel, Vernon T.: *See—*
Crawford, William B.; Daniel, Vernon T.; and Wang, Kenneth Y., 4,175,436, Cl. 73-338.600.

Dankert, Gerhard: *See—*
Lenthe, Manfred; and Dankert, Gerhard, 4,176,133, Cl. 260-465.50R.

Darlington, William B., to PPG Industries, Inc. Removal of part per billion level hardness impurities from alkali metal chloride brines. 4,176,022, Cl. 204-98.000.

Darms, Roland; Wyler, Siegfried; and Greber, Gerd, to Ciba-Geigy Corporation. Silicon-modified phthalic acid derivatives. 4,176,124, Cl. 260-346.300.

Davis, Billy J.; Kinsey, Cletus M.; Shen, Hwa J.; and Weber, James R., to Caterpillar Tractor Co. Hydrodynamic bearing having anticavitation recesses. 4,175,799, Cl. 308-9.000.

Davis, Carl A. Well collar or shoe and cementing/drilling process. 4,175,619, Cl. 166-291.000.

Davis, John R.: *See—*
Driver, Michael C.; Oakes, James G.; and Davis, John R., 4,176,295, Cl. 315-39.000.

Davis, Robert R.; Sill, Richard C.; and Yerkes, John W., to Atlantic Richfield Company. Luminescent solar collector. 4,175,980, Cl. 136-89.0FC.

Davis, William D., to General Electric Company. Positive ion smoke detector using a tungsten wire preheated in hydrogen to increase sensitivity. 4,176,311, Cl. 324-468.000.

Davison, Thomas W.: *See—*
Suzuki, Fred K.; and Davison, Thomas W., 4,175,543, Cl. 128-736.000.

Day, William A.: *See—*
Archer, Robert A.; and Day, William A., 4,176,233, Cl. 560-249.000.

Dayus, Barry R.: *See—*
Tatum, James R.; and Dayus, Barry R., 4,175,607, Cl. 160-1.000.

Debaigt, Jean, to CGEE Alsthom. Axial connection terminal. 4,175,822, Cl. 339-266.00R.

De brey, Robert J. Particle monitor. 4,175,892, Cl. 406-35.000.

Decker, Carl D.; and Holt, S. Kent, to Ralston Purina Company. Vegetable protein ingredient for Kamaboko products. 4,176,202, Cl. 426-574.000.

Decorzant, Rene: *See—*
Naf, Ferdinand; and Decorzant, Rene, 4,176,139, Cl. 260-586.00C.

Dedolph, Richard R., to Gravi-Mechanics Co. Rooting media and methods of making the same. 4,175,355, Cl. 47-64.000.

Deere & Company: *See—*
Brandau, Steven G.; and Carmichael, Robert L., 4,175,937, Cl. 55-419.000.

Dehne, Clarence A.; and Pachuta, Martin, to Jervis B. Webb Company. Drive unit for a conveyor chain. 4,175,657, Cl. 198-833.000.

de Koning, Jan; and van Zeggelaar, Gerrit H., to Goyo Ballast Company Ltd. Suction dredger. 4,175,342, Cl. 37-58.000.

Delagebeaudeuf, Daniel, to Thomson-CSF. Avalanche transit time diode with heterojunction structure. 4,176,366, Cl. 357-16.000.

de Lima Castro Neto, Eduardo. Device for closing bags. 4,175,782, Cl. 292-307.00R.

DeLuca, Paul V., to Porta Systems Corp. Telephone connector block. 4,176,257, Cl. 179-98.000.

de Mendonca, Paulo Ayres Falcao: *See—*
Paixao, Jose Marcio Jardim; and de Mendonca, Paulo Ayres Falcao, 4,176,159, Cl. 423-80.000.

Demou, John G.; and Pray, Edward R., to BASF Wyandotte Corporation. High resilience flexible foamed polyurethanes, foamable mixtures and process therefor. 4,176,218, Cl. 521-129.000.

de Niet, Edmond; and Rijckaert, Albert M. A., to U.S. Philips Corporation. Recording and/or reproducing apparatus for a magnetic record carrier in the form of a tape, provided with a control system for the magnetic head position. 4,176,381, Cl. 360-77.000.

Denton, Dennis N.; and Benjamin, Martin E., to Garlock Inc. Combination thrust washer and seal article, apparatus. 4,175,756, Cl. 277-189.000.

Derfler, William D.: *See—*
Allen, Terry M.; and Derfler, William D., 4,175,411, Cl. 2-173.000.

Derichs, Josef; and Koslowski, Gerhard, to W. Schlafhorst & Co. Thread brake. 4,175,718, Cl. 242-150.00R.

DeRosa, Louis A.; and Rogoff, Mortimer, to International Telephone & Telegraph Corp. Secure single sideband communication system using modulated noise subcarrier. 4,176,316, Cl. 325-32.000.

Desal-Chem, Inc.: *See—*
Childress, Donnie D., 4,176,023, Cl. 204-98.000.

Design Cote Corporation: *See—*
Brack, Karl, 4,176,212, Cl. 428-423.000.

Dethlefsen, Rolf, to Electric Power Research Institute, Inc. Explosively activated fault current limiter. 4,176,385, Cl. 361-58.000.

Dethloff, Finn H., to Ardal og Sunndal Verk a.s.; and Alcan Research and Development Limited. Process and apparatus for treatment of waste gases. 4,176,019, Cl. 204-67.000.

DeTournay, Henry R. Heavy duty spring testing apparatus and method. 4,175,431, Cl. 73-161.000.

Deubzer, Bernward; and Egerter, Norbert, to Wacker-Chemie GmbH. Process for increasing the molecular weight of silicon compounds. 4,176,128, Cl. 260-448.20E.

Deutch, Howard E. Form book. 4,175,340, Cl. 35-53.000.

Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co. Ltd. Resonator for a musical tone synthesizer. 4,175,463, Cl. 84-1.190.

Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co. Ltd. Musical tone generator with time variant overtones. 4,175,464, Cl. 84-1.240.

Devine, Thomas H. Cofferdam. 4,175,510, Cl. 114-227.000.

DeVita, Alphonse J.; Koester, Earl J.; Manoogian, David V.; and Sharenson, Stanley, to Raytheon Company. Method of operating a continuous wave radar. 4,176,351, Cl. 343-9.00R.

Dew, John N.; Britton, Michael W.; Harlacher, Eugene A.; and Kleinpeter, Joseph A., to Conoco Methanation Company. Method for activating a hydrodesulfurization catalyst. 4,176,087, Cl. 252-439.000.

Dew, John N.: *See*—
Britton, Michael W.; Harlacher, Eugene A.; Dew, John N.; and Kleinpeter, Joseph A., 4,175,928, Cl. 48-197.00R.

DeWard, Robert C.: *See*—
Kaminski, David G.; Fedde, Mickiel P.; and DeWard, Robert C., 4,176,394, Cl. 364-200.000.

D'Haenens, Irnee J.; and Ledergerber, Charles P., to Electromed Incorporated. Electrical massage device. 4,175,551, Cl. 128-24.400.

Diederen, Willi: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Diehl GmbH & Co.: *See*—
Korner, Otto; and Bardiani, Christian, 4,175,798, Cl. 305-58.00R.

Diem, Carl H. Random propelling device for balls and the like. 4,175,535, Cl. 124-7.000.

Diesel Kiki Co., Ltd.: *See*—
Asano, Eijiro; and Komori, Ryuichi, 4,175,530, Cl. 123-140.0FG.

Dieterich, Dieter: *See*—
Petinaux, Marcel; Dieterich, Dieter; and Markusch, Peter, 4,176,118, Cl. 260-239.00A.

Dietlein, Robert W. Ski holding system. 4,175,736, Cl. 269-88.000.

Dillner, Arthur M.; and Merker, Walter H., Jr., to Miner Enterprises, Inc. Method of preshortening draft gear. 4,175,667, Cl. 213-40.00R.

Dillon, Peter L. P.; and Bayer, Bryce E., to Eastman Kodak Company. Signal processing for discrete-sample-type-color-video signal. 4,176,373, Cl. 358-37.000.

DiMatteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., to Solid Photography Inc. Arrangement for sensing the geometric characteristics of an object. 4,175,862, Cl. 356-375.000.

Dimyan, Magid Y.; Hubbell, Wayne C.; Chang, Christopher T. M.; and Linn, John C., to Texas Instruments Incorporated. Bubble memory structure with enhanced data density. 4,176,404, Cl. 365-12.000.

Dionne, Joseph G. G.: *See*—
Thistle, William G.; and Dionne, Joseph G. G., 4,176,297, Cl. 315-150.000.

Ditges, Gunter; Mors, Wilhelm; and Gartner, Rolf, to Meyer, Roth & Pastor Maschinenfabrik GmbH. Flying shears for severing a running wire. 4,175,459, Cl. 83-315.000.

DiTullio, Joseph G.; Parad, Leonard I.; and Sommers, Donald J., to GTE Sylvania Incorporated. Diplexer apparatus. 4,176,330, Cl. 333-122.000.

Dixon, Rolland E., to Phillips Petroleum Company. Isoamylenes from butenes. 4,176,141, Cl. 585-314.000.

Dluehosh, Paul H.: *See*—
Tuttle, Lauren P.; and Dluehosh, Paul H., 4,176,254, Cl. 179-5.00R.

Dobkin, Robert C.; and Pease, Robert A., to National Semiconductor Corporation. Voltage regulator and current regulator. 4,176,308, Cl. 323-4.000.

Dobler, Peter: *See*—
Schoettle, Klaus; Dobler, Peter; Gliniorz, Lothar; Scherer, Volker; and Brombach, Heinz, 4,175,999, Cl. 156-505.000.

Dockner, Toni: *See*—
Platz, Rolf; Dockner, Toni; Heners, Jurgen; and Krug, Herbert, 4,176,137, Cl. 260-561.00N.

Dogliotti, Amilcare, to P. Ferrero & C. S.p.A. Display container for rounded articles. 4,175,665, Cl. 211-49.00D.

Dombrowski, Edward: *See*—
Johnson, Joseph E.; and Dombrowski, Edward, 4,176,004, Cl. 156-643.000.

Dominion Pharmacal, Inc.: *See*—
Olson, B. Newell, 4,176,197, Cl. 424-319.000.

Donabin, Claude J., to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme). Method and apparatus for processing documents. 4,175,694, Cl. 235-475.000.

Doryokuro Kakunenryo Kaihatsu Kigyodan: *See*—
Matsuura, Mitsuaki; Hidano, Tsuyoshi; and Suzuki, Masahiro, 4,175,318, Cl. 29-723.000.

Dotzer, Richard: *See*—
Stoger, Klaus; Dotzer, Richard; Stadter, Josef; and Gehring, Johann, 4,176,034, Cl. 204-200.000.

Douglas, George H.: *See*—
Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., 4,176,198, Cl. 424-330.000.

Douglas, Lawrence M., to Polaroid Corporation. Duel focal plane photocells. 4,175,843, Cl. 354-31.000.

Dow Chemical Company, The: *See*—
Hay, Robert A., II; and Boruszewski, John S., 4,175,998, Cl. 156-391.000.
Heisterkamp, Herbert W.; and Havens, Carl B., 4,176,155, Cl. 264-564.000.
Jernigan, Robert T.; and Sheffield, Byford D., 4,176,167, Cl. 423-476.000.
MacWilliams, Dalton C.; and Wirt, James R., 4,175,975, Cl. 106-100.000.

Dow Corning Corporation: *See*—
Baer, Stephen, 4,175,391, Cl. 60-531.000.

Downey, Holmes A., to Reliance Electric Corporation. Thrust cancelling shaft coupling. 4,175,406, Cl. 64-13.000.

Draisbach, Adolf; and Fiedler, Kurt H., to General Motors Corporation. Motor vehicle suspension struts. 4,175,770, Cl. 280-668.000.

Dravo Corporation: *See*—
Jaquay, Louis H., 4,175,732, Cl. 266-213.000.

Dreher, George L., to Beloit Corporation. Method and apparatus for reeling a plurality of ribbons. 4,175,714, Cl. 242-65.000.

Dreibelbis, Richard C., to Emerson Electric Co. (H&H Precision Products Div.). Thermally actuated phase change operated control valve for use in an energy conservation system. 4,175,697, Cl. 236-93.00A.

Dreyer, Heinz, to Amazonen-Werke H. Dreyer. Machine for the spreading of material in granular and powder form. 4,175,705, Cl. 239-651.000.

Driver, Michael C.; Oakes, James G.; and Davis, John R., to Westinghouse Electric Corp. High peak power microwave generator using light activated switches. 4,176,295, Cl. 315-39.000.

Dubois, Eugene. Balsawood stripper. 4,175,599, Cl. 144-175.000.

Dubois, Jean-Claude: *See*—
Bricot, Claude; Dubois, Jean-Claude; LeCarvennec, Francois; Lehureau, Jean-Claude; and Magna, Henriette, 4,176,277, Cl. 250-316.100.

Duchene, Georges, to Agence Nationale de Valorisation de la Recherche (ANVAR). Device for collecting solor energy with mat of intermingled fibers. 4,175,542, Cl. 126-449.000.

Dudek, Max; and Tieke, Otto, to Wintershall Aktiengesellschaft. Method of producing petroleum coke calcinate. 4,176,010, Cl. 201-27.000.

Dumortier, Robert. Latching arrangement for manhole cover. 4,175,781, Cl. 292-218.000.

Dunagan, Hiram J.: *See*—
Jacobs, Morris L.; and Dunagan, Hiram J., 4,175,457, Cl. 83-230.000.

Du Pont de Nemours, E. I., and Company: *See*—
Goddard, Steven J.; and Levitt, George, 4,175,948, Cl. 71-96.000.
Graham, Boynton, 4,176,028, Cl. 204-159.160.
Irwin, Robert S., 4,176,223, Cl. 528-170.000.
LeStrange, Raymond J., 4,175,970, Cl. 430-529.000.
Molnar, Charles J.; Price, Edward H.; and Resnick, Paul R., 4,176,215, Cl. 521-27.000.

Dura Corporation: *See*—
Murphy, George W., 4,175,765, Cl. 280-460.00A.

Durr, Larry J.; Durr, Larry L.; and Clay, B. Jan. Method for continuous vapor recovery. 4,175,932, Cl. 55-59.000.

Durr, Larry L.: *See*—
Durr, Larry J.; Durr, Larry L.; and Clay, B. Jan, 4,175,932, Cl. 55-59.000.

Dusko, Joseph R. Rotatable electrical connector units and lighting devices incorporating same. 4,175,809, Cl. 339-1.00L.

Dutko Incorporated: *See*—
Dutkovich, Steven J. E., 4,176,252, Cl. 179-1.00G.

Dutkovich, Steven J. E., to Dutko Incorporated. Multi-dimensional audio projector. 4,176,252, Cl. 179-1.00G.

DuVall, Bruce W.: *See*—
Schneider, John C.; Hanson, S. Eugene; and DuVall, Bruce W., 4,175,443, Cl. 73-722.000.

Duwel, Dieter: *See*—
Loewe, Heinz; Urbanietz, Josef; Duwel, Dieter; and Kirsch, Reinhard, 4,176,192, Cl. 424-300.000.

Dvorak, Josef: *See*—
Sevcik, Ladislav; Dvorak, Josef; and Mlynar, Jiri, 4,175,474, Cl. 92-13.500.

Dynamit Nobel, AG: *See*—
Knappworst, Jurgen; Brede, Uwe; and Zeiher, Erich, 4,175,492, Cl. 102-92.600.

Dynapol: *See*—
Brenzel, Daniel J., 4,176,136, Cl. 260-561.00R.

E. R. Squibb & Sons, Inc.: *See*—
Ondetti, Miguel A.; and Weisenborn, Frank L., 4,176,235, Cl. 562-556.000.

E-Systems, Inc.: *See*—
Powers, Vernon B., 4,176,272, Cl. 219-216.000.

Eames, Fred M., to Harris Corporation. Sensitivity and calibration control for television camera registration system. 4,176,374, Cl. 358-51.000.

Early California Industries, Inc.: *See*—
Crouch, Robert L., 4,176,071, Cl. 252-8.100.

Eastman Kodak Company: *See*—
Berwick, Martin A.; Fox, Charles J.; and Light, William A., 4,175,960, Cl. 430-58.000.
Dillon, Peter L. P.; and Bayer, Bryce E., 4,176,373, Cl. 358-37.000.
Figueras, John; Nelson, Roger W.; and Sutton, Richard C., 4,176,008, Cl. 435-12.000.
Haley, Neil F.; Krutak, James J.; and Ott, Robert J., 4,175,956, Cl. 430-37.000.
Howe, Dennis G., 4,176,377, Cl. 358-128.000.
Wright, Hal E.; and Berwick, Martin A., 4,175,961, Cl. 430-58.000.

Eaton Corporation: *See*—
Cornell, Charles R.; and Simpson, Dennis D., 4,175,628, Cl. 180-6.480.

Ebato, Seigo: *See*—
Yoshida, Akio; Tsubai, Yasuo; and Ebato, Seigo, 4,175,965, Cl. 430-230.000.

Ebauches S.A.: *See*—
Randin, Jean-Paul, 4,175,838, Cl. 350-357.000.

Eberlein, Wolfgang: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Ecker, Amir L.: *See—*
Edwards, Thomas C.; and Ecker, Amir L., 4,175,397, Cl. 62-149.000.
Edwards, Thomas C.; and Ecker, Amir L., 4,175,398, Cl. 62-172.000.
Edwards, Thomas C.; and Ecker, Amir L., 4,175,399, Cl. 62-172.000.
Edwards, Thomas C.; and Ecker, Amir L., 4,175,400, Cl. 62-174.000.
Eckert, Guenter; Knaflic, France; Miller, Franz-Friedrich; and Zissel, Alfred, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Dehairing skin and hide. 4,175,922, Cl. 8-94.160.
Eckhardt, Dennis C., to General Motors Corporation. Worm thread seal for steering gear. 4,175,475, Cl. 92-33.000.
Economopoulos, Marios: *See—*
Blondelot, Emile; Economopoulos, Marios; and Wilmotte, Stephan H., 4,175,985, Cl. 148-12.400.
Ederer, Georg; Fischer, Adolf; Rosche, Paul; Troll, Helmar; Wurst, Wolfgang; Hengl, Helmut; and Seidl, Jiri, to Bayerische Motoren Werke AG. Air induction system for an internal combustion engine. 4,175,504, Cl. 123-52.00M.
Ederer Incorporated: *See—*
Clarke, Charles W., 4,175,727, Cl. 254-173.00R.
Edgar Pickering (Blackburn) Ltd.: *See—*
Lund, Ernest K., 4,175,497, Cl. 112-79.00R.
Edwards, Albert, to Baker Perkins Holdings Limited. Method of operating a foundry sand mixing machine. 4,175,866, Cl. 366-2.000.
Edwards, Thomas C.; and Ecker, Amir L., to Rovac Corporation, The. Closed loop air conditioning system including pressurization by blockage and aspiration. 4,175,397, Cl. 62-149.000.
Edwards, Thomas C.; and Ecker, Amir L., to Rovac Corporation, The. Control system for air conditioner. 4,175,398, Cl. 62-172.000.
Edwards, Thomas C.; and Ecker, Amir L., to Rovac Corporation, The. Closed loop air conditioning system having automatic pressurizing means for variation of heat rate. 4,175,399, Cl. 62-172.000.
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Inanaga, Kiyofumi; Egawa, Saburo; Shimizu, Akio; and Maeda, Keijiro, 4,176,249, Cl. 179-1.00E.
Egerter, Norbert: *See—*
Deubzer, Bernward; and Egerter, Norbert, 4,176,128, Cl. 260-448.20E.
Ehrenberger, Gunter: *See—*
Mobus, Dietmar; Ehrenberger, Gunter; and Jobst, Wolfgang, 4,176,265, Cl. 200-316.000.
Eibofner, Eugen; and Balsys, Heinz, to Kaltenbach & Voigt GmbH & Co. Dental handpiece. 4,175,323, Cl. 433-126.000.
Eikelberger, Bruce H. Electric parking brake. 4,175,646, Cl. 188-156.000.
Eilersen, Nils A. J. Capacitive dynamometer. 4,175,428, Cl. 73-141.00A.
El Paso Environmental Systems, Inc.: *See—*
Wheatley, Robert T.; and Kosarek, Louis J., 4,176,057, Cl. 210-23.00H.
Elastogran Maschinenbau GmbH & Co.: *See—*
Schneider, Fritz W., 4,175,874, Cl. 366-182.000.
Elderfield, Kenneth J.; and Griffiths, Charles, to National Carbonising Company Limited. Meter provers. 4,175,421, Cl. 73-3.000.
Electric Power Research Institute, Inc.: *See—*
Dethlefsen, Rolf, 4,176,385, Cl. 361-58.000.
Kalsi, Swarn S.; and Chari, Madabushi V. K., 4,176,292, Cl. 310-52.000.
Rabinowitz, Mario, 4,176,291, Cl. 310-52.000.
Electro-Mechanical Products: *See—*
Tann, David, 4,176,264, Cl. 200-82.00E.
Electrochemische Energieconversie, N.V.: *See—*
van Linden, Jacques, 4,176,213, Cl. 429-12.000.
Electromed Incorporated: *See—*
D'Haenens, Irnee J.; and Ledergerber, Charles P., 4,175,551, Cl. 128-24.400.
Electronic Memories & Magnetics Corporation: *See—*
Leach, George S.; and O'Connell, Timothy R., 4,176,289, Cl. 307-270.000.
Elenga, Cornelis W.; van Dijk, Pieter; and van der Zwart, Alfred J., to U.S. Philips Corporation. Device comprising a transformer for stepwise varying voltages. 4,176,310, Cl. 323-7.000.
El Gammal, Maurice; and Rabinovitch, Maurice, to O.N.E.R.A. - Office National d'Etudes et de Recherches Aerospatiales. Process and apparatus for the molding of shaped articles from a composite metallic refractory material. 4,175,609, Cl. 164-60.000.
Eli Lilly and Company: *See—*
Archer, Robert A.; and Day, William A., 4,176,233, Cl. 560-249.000.
Elitex, Koncern textilniho strojirenstvi: *See—*
Sevcik, Ladislav; Dvorak, Josef; and Mlynar, Jiri, 4,175,474, Cl. 92-13.500.
Elmlinger, Eugene L.: *See—*
Tonges, Gerald A.; and Elmlinger, Eugene L., 4,175,774, Cl. 283-6.000.
Emerson Electric Co. (H&H Precision Products Div.): *See—*
Dreibelbis, Richard C., 4,175,697, Cl. 236-93.00A.
Emmerich, Kenneth C., to Fansteel Inc. Sealant system for roof drilling apparatus. 4,175,757, Cl. 277-212.00F.
Emmons Guitar Company, Inc.: *See—*
Lashley, Ronald T., 4,175,467, Cl. 84-312.00P.
Endo, Shinichiro: *See—*
Nakanishi, Sadao; Suzuki, Kazuhiro; Tokura, Nobufumi; and Endo, Shinichiro, 4,175,693, Cl. 235-463.000.
Engel, Derryl D. Fish lure. 4,175,349, Cl. 43-42.020.
Engeling, Charles F.; and Staubly, Ralph F. Supplemental air circulator for hot-air furnaces. 4,175,699, Cl. 237-55.000.
Englund, Robert M., to Sperry Rand Corporation. Signal scrambler-unscrambler for binary coded transmission system. 4,176,247, Cl. 178-22.000.
Epple, Peter C., to General Motors Corporation. Electric switch for motor reversing. 4,176,261, Cl. 200-1.00V.
Eremenko, Boris S.: *See—*
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.
Ernest, Robert P., to Ford Motor Company. Method of making air engine housing. 4,175,503, Cl. 123-41.720.
Ernst Leitz Wetzlar GmbH: *See—*
Kaul, Dietmar; and Willhelm, Joerg, 4,176,276, Cl. 250-237.00G.
Leitz, Ludwig; Heitmann, Knut; Schneider, Eckart; and Schmidt, Horst, 4,175,365, Cl. 356-4.000.
Erwin, Lewis, II: *See—*
Suh, Nam P.; Rotz, Christopher A.; and Erwin, Lewis, II, 4,175,871, Cl. 366-79.000.
Esanu, Andre, to Societe d'Etudes de Produits Chimiques. Therapeutic isobutyramides. 4,176,193, Cl. 424-304.000.
Escher Wyss GmbH: *See—*
Bubik, Alfred; and Reutter, Siegfried, 4,176,005, Cl. 162-256.000.
Ethyl Corporation: *See—*
Jackisch, Philip F., 4,176,072, Cl. 252-32.70E.
Niebylski, Leonard M., 4,175,927, Cl. 44-68.000.
Ethyl Development Corporation: *See—*
Robertson, Elmer L., 4,175,993, Cl. 156-234.000.
Etzler, John L. Plug-in bale mover. 4,175,900, Cl. 414-787.000.
Evelyn-Veere, Rene H.; and Ruggles, Richard L., to Clemar Manufacturing Corporation. Interactive irrigation control system. 4,176,395, Cl. 364-420.000.
Ewalt, Leonard J.; and Kaushal, Som N., to TRW Inc. Inert carrier gas heat treating control process. 4,175,986, Cl. 148-16.500.
Ewing, Keith: *See—*
Ashdown, Ronald A.; Ewing, Keith; and Birkenhead, Stuart I., 4,175,582, Cl. 137-334.000.
Exner, Gerhard; and Festinori, Volfango, to Kraftwerk Union Aktiengesellschaft. Device for tensioning several screw bolts. 4,175,453, Cl. 81-57.380.
Exxon Production Research Company: *See—*
Council, James M., 4,176,033, Cl. 204-197.000.
Templeton, John S., III, 4,175,445, Cl. 73-768.000.
Exxon Research & Engineering Co.: *See—*
Alexander, A. Gordon; and Coupland, Keith, 4,176,075, Cl. 252-42.100.
Coupland, Keith; Salva, Juan M.; and Smith, Clinton R., 4,176,074, Cl. 252-32.70E.
Cull, Neville L., 4,176,089, Cl. 252-452.000.
Guerre, Robert P.; Juedes, Dennis L.; and Ruland, Ross R., 4,175,920, Cl. 431-175.000.
Horowitz, Harold S.; Longo, John M.; and Lewandowski, Joseph T., 4,176,094, Cl. 252-518.000.
Luckenbach, Edward C., 4,176,084, Cl. 252-417.000.
Ryer, Jack; Winans, Esther D.; Brois, Stanley J.; and Gutierre, Antonio, 4,176,073, Cl. 252-32.70E.
White, Anthony M., 4,176,044, Cl. 208-46.000.
Winter, William E.; and Schuette, William L., 4,176,049, Cl. 208-70.000.
Wisotsky, Max J., 4,175,926, Cl. 44-62.000.
F. Jos. Lamb Company: *See—*
Skrentner, Frank C., 4,175,894, Cl. 408-1.00R.
Facet Enterprises, Inc.: *See—*
Miller, Donald L., 4,175,650, Cl. 192-84.00C.
Fahlstrom, Per A. H. H., to Boliden Aktiebolag. Method of treating shales. 4,176,042, Cl. 208-11.0LE.
Fales, David, III, to Martin Marietta Corporation. Passive method and apparatus for radar locating and parasitic surveilance. 4,176,357, Cl. 343-112.00R.
Fallon, John L.: *See—*
Colglazier, Donald F.; Fallon, John L.; Kimble, George P.; and Mares, Fred R., 4,175,741, Cl. 271-3.100.
Fansteel Inc.: *See—*
Emmerich, Kenneth C., 4,175,757, Cl. 277-212.00F.
Faron, Robert; and Cathala, Annie, to Produits Chimiques Ugine Kuhlmann. Electrolyte and process for electrolytic production of fluorine. 4,176,018, Cl. 204-60.000.
Fassett, Matthew; Pizette, Seymour B.; and Toth, John F., to Raytheon Company. Monopulse antenna system with independently specifiable patterns. 4,176,359, Cl. 343-854.000.
Faust, Guy K.: *See—*
Wagenknecht, Conrad D.; and Faust, Guy K., 4,175,384, Cl. 60-226.00B.
Favara, Louis J.: *See—*
Tyler, Truman V., 4,176,063, Cl. 210-101.000.
Favata, Theodore. Sealant composition. 4,176,102, Cl. 260-28.5AS.

Fazzini, Massimo, to Scharper S.p.A. Per l'Industria Farmaceutica. Process for the preparation of tris(hydroxymethyl)-aminomethan-lactate-dihydroxyaluminate. 4,176,129, Cl. 260-448.00R.
Fedde, Mickiel P.: *See—*
Kaminski, David G.; Fedde, Mickiel P.; and DeWard, Robert C., 4,176,394, Cl. 364-200.000.
Feibelman, Jeffrey A., to A & H Mfg. Co. Display package for jewelry and the like. 4,175,660, Cl. 206-468.000.
Feichtner, Wolfgang: *See—*
John, Peter; Feichtner, Wolfgang; Graf, Werner; and Frey, Volker, 4,176,130, Cl. 260-448.20E.
Ferguson, Thomas R., to Burroughs Corporation. Adjustable cable clamp for use with belted cables. 4,175,728, Cl. 269-91.000.
Ferrari, Giorgio; and Vecchietti, Vittorio, to SIMES Societa Italiana Medicinali e Sintetici S.p.A. Sulfamoyl derivatives of 8-β-aminomethylergoline. 4,176,182, Cl. 424-248.500.
Ferrero, John B.: *See—*
Vergnani, Leo H.; Ferrero, John B.; and Cassanelli, Ernest M., 4,175,417, Cl. 72-356.000.
Festinori, Volfango: *See—*
Exner, Gerhard; and Festinori, Volfango, 4,175,453, Cl. 81-57.380.
Fiat, S.p.A.: *See—*
Angelini, Sergio, 4,176,015, Cl. 204-28.000.
Fiebig, August E., Jr.: *See—*
Cella, John A.; and Fiebig, August E., Jr., 4,176,176, Cl. 424-70.000.
Fiedler, Kurt H.: *See—*
Draisbach, Adolf; and Fiedler, Kurt H., 4,175,770, Cl. 280-668.000.
Figueras, John; Nelson, Roger W.; and Sutton, Richard C., to Eastman Kodak Company. Method, composition and element for the detection of nitrogen-containing compounds. 4,176,008, Cl. 435-12.000.
Finger, Torsten: *See—*
Wilmes, Manfred; Finger, Torsten; Fitzler, Arno; Kretzschmar, Wolfgang; and Franke, Heinrich, 4,175,820, Cl. 339-198.00R.
Finkelstein, Wolfgang; Baumeister, Gregor; and Haaz, Josef, to Gebruder Trox, Gesellschaft mit Beschrankter Haftung. Regulator valve. 4,175,583, Cl. 137-504.000.
Fireplace Energy Inc.: *See—*
McGuire, C. James, 4,175,539, Cl. 126-121.000.
Firmenich SA: *See—*
Naf, Ferdinand; and Decorzant, Rene, 4,176,139, Cl. 260-586.00C.
Fischer, Adolf: *See—*
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Fischer & Porter Co.: *See—*
Rosenblum, Richard, 4,176,031, Cl. 204-195.00R.
Stevenson, Roberts G., Jr., 4,176,032, Cl. 204-195.00P.
Fisher, Michael H.: *See—*
Ruyle, William V.; and Fisher, Michael H., 4,176,187, Cl. 424-263.000.
Fitzler, Arno: *See—*
Wilmes, Manfred; Finger, Torsten; Fitzler, Arno; Kretzschmar, Wolfgang; and Franke, Heinrich, 4,175,820, Cl. 339-198.00R.
Fix, George L.: *See—*
Baker, Thomas E.; Fix, George L.; and Judge, John S., 4,176,209, Cl. 427-248.00B.
Fleisher, Seymour; and Rosenschein, Warner. Motorized bicycle with removable fuel tank. 4,175,630, Cl. 180-225.000.
Fletcher, John M., to British Steel Corporation (Chemicals) Limited. Plasma flame spray coated graphite dies. 4,175,611, Cl. 164-418.000.
Fliegel, Martin S. Intravenous alarm system. 4,176,349, Cl. 340-613.000.
FN International Societe Anonyme: *See—*
Gevers, Georges A.; and Jeghers, Philippe M., 4,175,745, Cl. 273-73.00C.
Ford Motor Company: *See—*
Ernest, Robert P., 4,175,503, Cl. 123-41.720.
Manning, Walter; and Bradley, Terry G., 4,175,449, Cl. 74-492.000.
Forsyth Dental Infirmary for Children: *See—*
Goodson, Jo M., 4,175,326, Cl. 433-80.000.
Forward, Robert L.; and Thurmond, Gary D., to Hughes Aircraft Company. Network for simulating low-noise-temperature resistors. 4,176,331, Cl. 333-213.000.
Foss, Steven K., to Krestmark Industries, Inc. Stop mechanism. 4,175,737, Cl. 269-317.000.
Foster, L. Curtis; and Lindholm, Carl E., to Motorola, Inc. Directional antenna system including pattern control. 4,176,356, Cl. 343-100.0CS.
Foster Wheeler Energy Corporation: *See—*
Apblett, William R., Jr., 4,175,779, Cl. 285-115.000.
Ashdown, Ronald A.; Ewing, Keith; and Birkenhead, Stuart I., 4,175,582, Cl. 137-334.000.
Pratt, Harry H.; and Money, Dudley P., 4,175,519, Cl. 122-510.000.
Fox, Charles J.: *See—*
Berwick, Martin A.; Fox, Charles J.; and Light, William A., 4,175,960, Cl. 430-58.000.
Fox, Roy A.; and Mortimer, Bradford T., to Standard Oil Company (Indiana). Asbestos-free tape sealant. 4,176,097, Cl. 260-17.4BB.
Foxboro Company, The: *See—*
Gilby, Anthony C., 4,175,864, Cl. 356-326.000.
Fraenkel, Stephen J., to Container Corporation of America. Method and apparatus for separating fibers from agglomerated masses thereof. 4,175,709, Cl. 241-21.000.
Frank, Engelbert. Rotary vane drive with rotating cylinder. 4,175,393, Cl. 60-671.000.
Fránk F. Souza, Inc.: *See—*
Souza, Frank F.; Silva, Vernon A.; and Cabral, Tony, 4,175,514, Cl. 119-14.080.
Franke, Heinrich: *See—*
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Frantzreb, John G., Sr., to Caterpillar Tractor Co. Elongate consolidated article and method of making. 4,175,918, Cl. 428-567.000.
Franz, John E.; and Kaufman, Robert J., to Monsanto Company. Thio derivatives of N-trifluoroacetyl-N-phosphonomethylglycine. 4,175,946, Cl. 71-87.000.
Frauenhoffer, Josef; and Ruger, Gerd, to Lohr & Bromkamp GmbH. Apparatus for assembling roller bearings. 4,175,319, Cl. 29-724.000.
Frederick, Charles V. Wall structure. 4,175,362, Cl. 52-274.000.
Freezer, Winthrop J. Inhaler with flow-through cap. 4,175,556, Cl. 128-198.000.
Freund, Ronald G.: *See—*
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Frey, Volker: *See—*
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Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Aechter, Burckhard; and Gerlach, Manfred, 4,176,337, Cl. 367-131.000.
Friend, William G. Method and apparatus for occult blood testing in the home. 4,175,923, Cl. 23-230.00B.
Froehlich, Frederick B.; Hennings, Roy; and Schaffer, William J., to International Business Machines Corporation. High performance tape path for a 19 inch tape recorder. 4,176,382, Cl. 360-95.000.
Frumerman, Robert; and Hooper, Harold M., to United States of America, Energy. Process for control of pollutants generated during coal gasification. 4,175,929, Cl. 48-202.000.
Fruth, Albert; and Harenberg, Juergen, to Siemens Aktiengesellschaft. Circuit arrangement for time-dependent monitoring of the state of lines. 4,176,256, Cl. 179-18.0FG.
Fuji Photo Film Co., Ltd.: *See—*
Shinozaki, Fumiaki; Washigawa, Yasuo; Ikeda, Tomoaki; Nakao, Sho; and Kondoh, Syunichi, 4,175,971, Cl. 430-287.000.
Uchida, Toshio; Yabuta, Yorimiti; and Ikeda, Teppei, 4,175,964, Cl. 430-253.000.
Ueda, Hideo; and Sawaguchi, Hiroshi, 4,176,134, Cl. 260-543.00R.
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Fujie, Tetsuo; and Ito, Hiromi, to Olympus Optical Company Limited. Light and heat writing pen for photosensitive material. 4,176,273, Cl. 219-220.000.
Fujimoto, Kazuyuki: *See—*
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Fujita, Toshihito: *See—*
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Fujiwara, Kenji: *See—*
Sakakibara, Shumpei; Nagai, Yutaka; Fujiwara, Kenji; and Sakai, Takahiro, 4,176,009, Cl. 435-24.000.
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kaneko, Yutaka; and Kawasaki, Mikio, to Konishiroku Photo Industry Co., Ltd. Light-sensitive black-white silver halide photographic material for forming a high-contrast silver image and method of treating thereof. 4,175,966, Cl. 430-438.000.
Fukuda, Motoo. Explosion proof device for a pressure accumulator having a valve portion. 4,175,678, Cl. 222-54.000.
Fukuda, Tamotsu: *See—*
Hattori, Tadashi; Takata, Akira; Fukuda, Tamotsu; and Nakase, Takamichi, 4,175,521, Cl. 123-119.00D.
Fukuhara, Toshihiko, to Kabushiki Kaisha Komatsu Seisakusho. Apparatus for detecting crack length of a test piece in a fatigue test. 4,175,447, Cl. 73-799.000.
Fukushima, Toshihiko; Fujie, Kunio; Arai, Akira; Arai, Nobukatsu; and Kakizaki, Kimio, to Hitachi, Ltd. Apparatus for manufacturing heat transfer tubes. 4,175,416, Cl. 72-254.000.
Funken Co., Ltd.: *See—*
Iwako, Hiroyuki; and Ando, Shigeki, 4,175,873, Cl. 366-165.000.
Furuhashi, Susumu: *See—*
Misumi, Teruyuki; Furuhashi, Susumu; and Shiga, Masaaki, 4,176,020, Cl. 204-72.000.
G. D. Societa per Azioni: *See—*
Seragnoli, Enzo, 4,175,456, Cl. 83-176.000.
Gabr, Saad Z. M. Current loaded pneumatically driven loudspeaker arrangements. 4,176,253, Cl. 179-1.00E.
Gaetzi, Robert, to Anstalt Europaische Handelsgesellschaft. Apparatus for the transmission end-enciphering and reception end-deciphering of information. 4,176,246, Cl. 178-22.000.
GAF Corporation: *See—*
Mackey, E. Scudder, 4,175,969, Cl. 430-539.000.
Skinner, David B., 4,176,210, Cl. 427-258.000.
Gagnon, Claude F.: *See—*
Cormier, Richard A.; and Gagnon, Claude F., 4,176,006, Cl. 435-74.000.
Gainer, John L., to University of Virginia Alumni Patents Foundation, The. Method for treating arthritis. 4,176,179, Cl. 424-180.000.
Galbert, David R., to Galbert-French, Inc. Light. 4,176,390, Cl. 362-72.000.
Galbert-French, Inc.: *See—*
Galbert, David R., 4,176,390, Cl. 362-72.000.

Galperin, Alexandr L.: *See*—
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Garbuny, Max, to Westinghouse Electric Corp. Gas dynamic reaction process and system for laser chemistry. 4,176,024, Cl. 204-157.10R.

Garlock Inc.: *See*—
Denton, Dennis N.; and Benjamin, Martin E., 4,175,756, Cl. 277-189.000.

Garrett Corporation, The: *See*—
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Garrison, R. Leonard, Jr.: *See*—
Garrison, Ray L., deceased; and Garrison, R. Leonard, Jr., 4,175,905, Cl. 414-462.000.

Garrison, Ray L., deceased; and Garrison, R. Leonard, Jr. Boat loader. 4,175,905, Cl. 414-462.000.

Garthus, Donald R.; and Robinson, L. T., to Interlake, Inc. Coke oven door seal assembly. 4,176,013, Cl. 202-242.000.

Gartner, Rolf: *See*—
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Garwood, William E.: *See*—
Chen, Nai Y.; Garwood, William E.; and Peters, Alan W., 4,176,050, Cl. 208-111.000.

Gasser, Hermann; and Curiger, Karl, to Luwa AG. Broken end-collecting installation and method of operating the same. 4,175,371, Cl. 57-304.000.

Gattus, Yves, to S. A. Martin. Inking and washing circuit for a flexographic printing machine. 4,175,489, Cl. 101-366.000.

Gausewitz, Carr & Rothenberg: *See*—
Tyler, Truman V., 4,176,063, Cl. 210-101.000.

Gay, Leslie W.: *See*—
Tobin, Joseph J.; Robinson, David B.; Peay, Robert L.; Powell, Jerry R.; and Gay, Leslie W., 4,176,348, Cl. 340-562.000.

Geafer, Salahaddin; and Zbikowski, Gerhard, to Motoren- und Turbinen-Union Friedrichafen GmbH. Regulating device. 4,175,529, Cl. 123-140.00R.

Geary, Carl H., to Carrier Corporation. Mechanical seal assembly. 4,175,755, Cl. 277-137.000.

Gebruder Trox, Gesellschaft mit Beschrankter Haftung: *See*—
Finkelstein, Wolfgang; Baumeister, Gregor; and Haaz, Josef, 4,175,583, Cl. 137-504.000.

GEC Medical Equipment Limited: *See*—
Sandbank, Hans A., 4,175,664, Cl. 209-657.000.

Gehring, Johann: *See*—
Stoger, Klaus; Dotzer, Richard; Stadter, Josef; and Gehring, Johann, 4,176,034, Cl. 204-200.000.

Gehrke, Erich F. Support and/or locating means for rails in rail tracks. 4,175,700, Cl. 238-299.000.

Gendrot, Andre. Electrical control systems for transmitting signals of different magnitudes. 4,176,342, Cl. 340-166.00R.

General Atomic Company: *See*—
Mysels, Karol J., 4,176,169, Cl. 423-501.000.

General Cable Corporation: *See*—
Ramy, Towheed; and Hore, Lal M., 4,176,244, Cl. 174-88.00C.

General Electric Company: *See*—
Anderson, John M., 4,176,296, Cl. 315-71.000.
Blair, Lloyd S., 4,175,615, Cl. 165-106.000.
Cella, James A., 4,176,111, Cl. 260-37.0SB.
Cella, James A.; and Mitchell, Tyrone D., 4,176,112, Cl. 260-37.0SB.
Crivello, James V., 4,175,963, Cl. 430-296.000.
Crivello, James V., 4,175,972, Cl. 204-159.180.
Crivello, James V., 4,175,973, Cl. 204-159.140.
Cushing, Donald S., 4,175,575, Cl. 134-176.000.
Davis, William D., 4,176,311, Cl. 324-468.000.
Hahn, Thomas M.; Lohmus, Ivar; and Oakley, David E., 4,175,617, Cl. 165-122.000.
Morey, Everett D., 4,175,409, Cl. 68-4.000.
Nash, Dudley O., 4,175,385, Cl. 60-230.000.
Tachick, Henry N.; Arnold, Reginald S.; Belcher, James E.; and St. Jacques, Joseph A., 4,175,817, Cl. 339-111.000.
Wagenknecht, Conrad D.; and Faust, Guy K., 4,175,384, Cl. 60-226.00B.

General Engines Co., Inc.: *See*—
Kalajzich, Albert A., 4,175,629, Cl. 180-220.000.

General Motors Corporation: *See*—
Barnard, James A., 4,175,309, Cl. 29-157.30R.
Berglind, Bradford L., 4,176,250, Cl. 179-1.0VE.
Black, Dennis A.; and Mantey, Raymond N., 4,175,915, Cl. 417-222.000.
Black, Dennis A.; and Mantey, Raymond N., 4,175,915, Cl. 417-222.000.
Draisbach, Adolf; and Fiedler, Kurt H., 4,175,770, Cl. 280-668.000.
Eckhardt, Dennis C., 4,175,475, Cl. 92-33.000.
Epple, Peter C., 4,176,261, Cl. 200-1.00V.
Milbreath, Herman C.; and Williams, Alverson B., 4,175,388, Cl. 60-337.000.
Miller, Larry D., 4,175,773, Cl. 280-803.000.
Mobus, Dietmar; Ehrenberger, Gunter; and Jobst, Wolfgang, 4,176,265, Cl. 200-316.000.
Muzechuk, Richard A.; and Hyma, Marvin J., 4,175,771, Cl. 280-696.000.

Genis, James; and Mars, William T., to McNeil Corporation. Travelling cut-off saw. 4,175,455, Cl. 83-110.000.

Geokinetics Inc.: *See*—
Britton, Keith C.; and Lekas, Mitchell A., 4,175,490, Cl. 102-23.000.

George, James S.; Ward, Arthur G. T.; and Pastakia, Percy N., to BPB Industries Limited. Calcining calcium sulphate dihydrate. 4,176,157, Cl. 422-114.000.

Gerlach, Manfred: *See*—
Aechter, Burckhard; and Gerlach, Manfred, 4,176,337, Cl. 367-131.000.

Gerling, John E., to Gerling Moore, Inc. System for heating using a microwave oven assembly and method. 4,176,268, Cl. 219-10.55A.

Gerling Moore, Inc.: *See*—
Gerling, John E., 4,176,268, Cl. 219-10.55A.

Gerlinger, Frederic, to Kuhn S.A. Haymaking machine with lateral discharge windrowing and central tedding. 4,175,369, Cl. 56-370.000.

Germeraad, Paul B.: *See*—
Gotcher, Alan J.; Germeraad, Paul B.; and White, Larry J., 4,176,027, Cl. 204-159.150.

Gerow, Frank J. Prosthesis of male impotence. 4,175,554, Cl. 128-79.000.

Gerstmann, Joseph, to Scientific Energy Systems Corporation. Spray nozzle. 4,175,706, Cl. 239-414.000.

Gevers, Georges A.; and Jeghers, Philippe M., to FN International Societe Anonyme. Racket. 4,175,745, Cl. 273-73.00C.

Gibert, Henri, to Agence Nationale de Valorisation de la Rechercha (ANVAR). Method of and apparatus for freeze-drying previously frozen products. 4,175,334, Cl. 34-5.000.

Gibson, Carl H. Apparatus for towing an underwater instrumentation package. 4,175,432, Cl. 73-170.00A.

Giebeler, Robert H., to Varian Associates, Inc. Thermionic cathode heater having reduced magnetic field. 4,176,293, Cl. 313-343.000.

Gilby, Anthony C., to Foxboro Company, The. Astigmatic illuminating system in an internal reflection spectometer. 4,175,864, Cl. 356-326.000.

Gilead, Gideon. Hose conduits for drip- or trickle emission. 4,175,882, Cl. 405-43.000.

Gill, Stephen H.: *See*—
Knell, Harvey A.; and Gill, Stephen H., 4,175,907, Cl. 414-715.000.

Gillis, Robert E. Clip for gripping fabric or the like. 4,175,305, Cl. 24-245.00R.

Girling Limited: *See*—
Mortimer, Ivan; and Layton, Charles T., 4,175,795, Cl. 303-118.000.

Giversen, Terri A.: *See*—
Lewis, Robert B.; and Giversen, Terri A., 4,176,142, Cl. 525-336.000.

Glaenzer Spicer: *See*—
Orain, Michel, 4,175,407, Cl. 64-21.000.

Glaser-Inbari, Isaia, to Yeda Research & Development Co. Ltd. Optical imaging system. 4,175,844, Cl. 354-110.000.

Gliniorz, Lothar: *See*—
Schoettle, Klaus; Dobler, Peter; Gliniorz, Lothar; Scherer, Volker; and Brombach, Heinz, 4,175,999, Cl. 156-505.000.

Gocho, Nagahiro: *See*—
Kamachi, Shinichi; Izawa, Masao; Gocho, Nagahiro; Nakajima, Yoshio; and Hattori, Shinichiro, 4,176,376, Cl. 358-107.000.

Goddard, Steven J.; and Levitt, George, to Du Pont de Nemours, E. I., and Company. Substituted isoindoles. 4,175,948, Cl. 71-96.000.

Goelz, David W.: *See*—
Hetherington, Robert D.; and Goelz, David W., 4,175,702, Cl. 239-113.000.

Goins, Jerry D.: *See*—
Renaud, Ronnie C.; and Goins, Jerry D., 4,175,676, Cl. 221-211.000.

Goldberg, Leon I.; Merz, Herbert; and Stockhaus, Klaus, to Boehringer Ingelheim GmbH. Quaternary derivatives of noroxymorphone which relieve intestinal immobility. 4,176,186, Cl. 424-260.000.

Goldblatt, Samuel; and Scott, Waller M., Jr., to Leichtman, Ahron P. Device for measuring sensitivity to vibration. 4,175,546, Cl. 128-739.000.

Goldhaber, Marvin L. Protective enclosure for building openings. 4,175,357, Cl. 49-395.000.

Goldman, Harley R. Variable control for toilet flush tanks. 4,175,296, Cl. 4-325.000.

Goldstein, David J. Apparatus for recovering paper in usable form from a damaged roll. 4,175,454, Cl. 82-86.000.

Golenchenko, Valery A.: *See*—
Vulis, Mikhail L.; Golenchenko, Valery A.; Rybin, Igor V.; and Shenderovich, Pavel B., 4,176,238, Cl. 174-15.00S.

Golomovzjuk, Ivan K.: *See*—
Kuchuk-Yatsenko, Sergei I.; Golomovzjuk, Ivan K.; Krivenko, Valery G.; Kulesh, Alexandr I.; Sakharnov, Vasily A.; Lazebny, Ivan L.; and Porkhun, Fedor K., 4,175,897, Cl. 409-300.000.

Golser, Leopold; Czepel, Hubert; and Stern, Gernard, to Chemie Linz Aktiengesellschaft. Process for the manufacture of foamed plastics with improved combustion characteristics. 4,176,217, Cl. 521-106.000.

Goodson, Jo M., to Forsyth Dental Infirmary for Children. Hollow-fiber devices for and a method of the treament and diagnosis of oral diseases. 4,175,326, Cl. 433-80.000.

Goodwin, Genevieve M.: *See*—
Bringman, Bernard B.; and Goodwin, Genevieve M., 4,176,001, Cl. 156-581.000.

Gorbulev, Efim S.: *See*—
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.

Gosudarstvenny Nauchno-Issledovatelsky Energeticheskiy Institut Imeni G.M. Krzhizhanovskogo (ENIN): *See*—
Vulis, Mikhail L.; Golenchenko, Valery A.; Rybin, Igor V.; and Shenderovich, Pavel B., 4,176,238, Cl. 174-15.00S.

Gotcher, Alan J.; Germeraad, Paul B.; and White, Larry J., to Raychem Corporation. Shaped article of radiation crosslinked triazine-trione polymeric composition. 4,176,027, Cl. 204-159.150.

Goto, Kenji; Yokota, Masato; and Kobayashi, Hideo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine with an auxiliary combustion chamber. 4,175,533, Cl. 123-191.00S.

Goto, Kiyoshi: *See*—
Kawada, Hiroh; Goto, Kiyoshi; and Kurita, Yoshio, 4,176,361, Cl. 346-1.100.
Tsuchiya, Shozo; Hayashi, Hideo; Sasaki, Makoto; Goto, Kiyoshi; and Ihida, Kazuyoshi, 4,176,146, Cl. 525-338.000.

Goto, Nobutaka, to Chlorine Engineers Corp., Ltd. Process for producing chlorine dioxide. 4,176,168, Cl. 423-478.000.

Goyo Ballast Company Ltd.: *See*—
de Koning, Jan; and van Zeggelaar, Gerrit H., 4,175,342, Cl. 37-58.000.

Grabner, Bernd E.; and Heinricher, Mario G., to Oesterreichisch-Amerikanische Magnesit Aktiengesellschaft. Sliding shutters of basic refractory material. 4,175,974, Cl. 106-58.000.

Graf, Werner: *See*—
John, Peter; Feichtner, Wolfgang; Graf, Werner; and Frey, Volker, 4,176,130, Cl. 260-448.20E.

Graham, Boynton, to Du Pont de Nemours, E. I., and Company. Plastisols made with polyelectrolyte binders. 4,176,028, Cl. 204-159.160.

Granberg, Erlang W.: *See*—
Pospischil, Albert R.; Bruegman, Michael L.; and Granberg, Erlang W., 4,175,989, Cl. 194-1.00C.

Grandclement, Gerard, to International Cold Forging Corporation. Electric valves. 4,175,590, Cl. 137-883.000.

Grant, R. Peter: *See*—
Leslie, John P.; Lane, Constance A.; and Grant, R. Peter, 4,176,101, Cl. 260-22.00T.

Grasselli, Robert K.; Miller, Arthur F.; and Hardman, Harley F., to Standard Oil Company. Process for the oxidation of olefins to aldehydes and acids. 4,176,234, Cl. 562-546.000.

Gravi-Mechanics Co.: *See*—
Dedolph, Richard R., 4,175,355, Cl. 47-64.000.

Grawey, Charles E., to Caterpillar Tractor Co. Method of making high pressure reinforced hydraulic hose. 4,175,992, Cl. 156-143.000.

Great Lakes Carbon Corporation: *See*—
Shea, Frederick L., Jr., 4,175,723, Cl. 244-162.000.

Greber, Gerd: *See*—
Darms, Roland; Wyler, Siegfried; and Greber, Gerd, 4,176,124, Cl. 260-346.300.

Green, Roger H.: *See*—
Cruden, John M.; Bignold, Alan J.; Green, Roger H.; and Grisenthwaite, Ronald J., 4,176,103, Cl. 260-29.6RW.

Greer, Norman L.: *See*—
Housholder, William R.; and Greer, Norman L., 4,175,669, Cl. 220-5.00A.

Greiner, Harry S.: *See*—
Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, 4,176,172, Cl. 423-634.000.

Greschat, Walter; and Schwierz, Guenter, to Siemens Aktiengesellschaft. Tomographic x-ray apparatus for producing transverse layer images. 4,176,280, Cl. 250-445.00T.

Grier, Jesse G., to Pennwalt Corporation. Cyclic operation of a bed of mixed ion exchange resins. 4,176,056, Cl. 210-20.000.

Griffin, Charles R.: *See*—
Leavy, William A.; and Griffin, Charles R., 4,176,360, Cl. 343-883.000.

Griffin, Jerry R. Device for aligning pipes to be joined. 4,175,735, Cl. 269-49.000.

Griffiths, Charles: *See*—
Elderfield, Kenneth J.; and Griffiths, Charles, 4,175,421, Cl. 73-3.000.

Grisenthwaite, Ronald J.: *See*—
Cruden, John M.; Bignold, Alan J.; Green, Roger H.; and Grisenthwaite, Ronald J., 4,176,103, Cl. 260-29.6RW.

Grobler, Jacobus J. Method means for de-silting water. 4,176,058, Cl. 210-44.000.

Grosser, Gunter: *See*—
Tamm, Rolf G.; Grosser, Gunter; and Tomoff, Toma, 4,175,863, Cl. 356-312.000.

Grunvogel, Karl: *See*—
Muller, Ortwin; Grunvogel, Karl; and Schulz, Kurt, 4,175,839, Cl. 351-14.000.

GTE Laboratories Incorporated: *See*—
Klinedinst, Keith A.; and Schlaikjer, Carl R., 4,176,214, Cl. 429-194.000.

GTE Sylvania Incorporated: *See*—
DiTullio, Joseph G.; Parad, Leonard I.; and Sommers, Donald J., 4,176,330, Cl. 333-122.000.
Harvey, William J.; McDonough, Thomas B.; and Shaffer, John W., 4,176,389, Cl. 362-5.000.
Lagos, Costas C.; Lanio, Ricardo A.; Crowley, John L.; and Moreau, Norman A., 4,175,941, Cl. 65-60.00B.

Gudmestad, Ragnar, to Artos Engineering Company. Wire lead clamping mechanism for wire lead production apparatus. 4,175,316, Cl. 29-564.400.

Guerre, Robert P.; Juedes, Dennis L.; and Ruland, Ross R., to Exxon Research & Engineering Co. Multiple fuel supply system for staged air burners. 4,175,920, Cl. 431-175.000.

Guerry, Raymond E.; and Whyte, David D., to Procter & Gamble Company, The. Water-soluble enzyme-containing article. 4,176,079, Cl. 252-90.000.

Guillet, James E. Photodegradable polymer compositions comprising blends of polymers with ketone-containing block or graft copolymers. 4,176,145, Cl. 525-72.000.

Guillory, Melvin J., Jr.: *See*—
Sury, Yel S.; and Guillory, Melvin J., Jr., 4,176,060, Cl. 210-62.000.

Gustafson, Thomas A. Ski-sled. 4,175,760, Cl. 280-16.000.

Gute, Robert M., to Midland-Ross Corporation. Air pressure brake arrangement for tractor and semi-trailer combinations. 4,175,588, Cl. 137-625.400.

Gutermuth, Paul; Heinrich, Oetjen; and Gutermuth, Paul, Jr. Planar condensor array of hollow interleaved profiles. 4,175,935, Cl. 55-269.000.

Gutermuth, Paul, Jr.: *See*—
Gutermuth, Paul; Heinrich, Oetjen; and Gutermuth, Paul, Jr., 4,175,935, Cl. 55-269.000.

Gutierre, Antonio: *See*—
Ryer, Jack; Winans, Esther D.; Brois, Stanley J.; and Gutierre, Antonio, 4,176,073, Cl. 252-32.70E.

Gutman, Arnold D., to Stauffer Chemical Company. 1,3-Oxazole phosphates and phosphonates. 4,176,121, Cl. 548-119.000.

H. G. Weber & Co., Inc.: *See*—
Kidd, Arthur H., 4,175,476, Cl. 93-1.00E.

Haarmann, Walter: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Haaz, Josef: *See*—
Finkelstein, Wolfgang; Baumeister, Gregor; and Haaz, Josef, 4,175,583, Cl. 137-504.000.

Habicht, Ernst, to Ciba-Geigy Corporation. Diuretic and saliuretic sulphamoylbenzoic acids. 4,176,190, Cl. 424-274.000.

Haerer, Wolfgang: *See*—
Schwierz, Gunter; and Haerer, Wolfgang, 4,176,279, Cl. 250-445.00T.

Hagenmuller, Paul: *See*—
Quenisset, Jean-Michel; Naslain, Rober; and Hagenmuller, Paul, 4,176,002, Cl. 156-601.000.

Hahn, Thomas M.; Lohmus, Ivar; and Oakley, David E., to General Electric Company. Skewed turn coiled tube heat exchanger for refrigerator evaporators. 4,175,617, Cl. 165-122.000.

Haley, Neil F.; Krutak, James J.; and Ott, Robert J., to Eastman Kodak Company. Electrophotosensitive materials for migration imaging processes. 4,175,956, Cl. 430-37.000.

Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick L.; and Vock, Manfred H., to International Flavors & Fragrances Inc. Substituted-1-ocetyl-3,3-dimethylcyclohexane employed in flavoring tobacco compositions. 4,175,569, Cl. 131-9.000.

Hall, Wilbur L.: *See*—
Wu, Ching H.; Brown, Alfred; Hall, Wilbur L.; and Shupe, Russell D., 4,175,618, Cl. 166-252.000.

Halliburton Company: *See*—
Nunez, Carl W.; and Squyres, Joseph S., 4,175,778, Cl. 285-3.000.

Halm, Hans, to Niveau AG, Firma. Index card register with selector device. 4,175,663, Cl. 209-610.000.

Hamer, Geerd. Bed for patients. 4,175,549, Cl. 128-24.00R.

Hammann, Ingeborg: *See*—
Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, 4,176,181, Cl. 424-211.000.

Hanano, Masamitu: *See*—
Kubota, Masayuki; and Hanano, Masamitu, 4,175,653, Cl. 198-332.000.

Hanaoka, Seiji, to Shinshu Seiki Kabushiki Kaisha; and Kabushiki Kaisha Suwa Seikosha. Drive mechanism for printer. 4,175,876, Cl. 400-124.000.

Hancock, Kenneth R.: *See*—
Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, 4,176,172, Cl. 423-634.000.

Handler, Erich: *See*—
Schatzler, Walter; and Handler, Erich, 4,175,784, Cl. 296-137.00E.

Handte, Reinhard: *See*—
Koch, Manfred; Handte, Reinhard; Horlein, Gerhard; Bieringer, Hermann; and Langeluddeke, Peter, 4,175,947, Cl. 71-88.000.

Hanke, Hans, to Daimler-Benz Aktiengesellschaft. Hydrodynamic retarder for vehicles, especially for motor vehicles. 4,175,647, Cl. 188-274.000.

Hanlon, Richard J.: *See*—
Holt, Richard C.; Damon, Neil F.; and Hanlon, Richard J., 4,175,810, Cl. 339-17.00C.

Hannemann, Horst: *See*—
Regehr, Ulrich; Hannemann, Horst; and Speitkamp, Ludwig, 4,175,938, Cl. 55-440.000.

Hanson, S. Eugene: *See*—
Schneider, John C.; Hanson, S. Eugene; and DuVall, Bruce W., 4,175,443, Cl. 73-722.000.

Hansson, Anders: *See*—
Odlen, Lars; and Hansson, Anders, 4,176,251, Cl. 179-1.0SW.

Hara, Kunio, to Nifco Inc. Liquid level detecting device. 4,175,435, Cl. 73-313.000.

Hardman, Harley F.: *See—*
Grasselli, Robert K.; Miller, Arthur F.; and Hardman, Harley F., 4,176,234, Cl. 562-546.000.

Harenberg, Juergen: *See—*
Fruth, Albert; and Harenberg, Juergen, 4,176,256, Cl. 179-18.0FG.

Hargett, William D.; and Broun, Thorowgood T., to PPG Industries, Inc. Treatment of alkyl lead-containing gas stream. 4,176,165, Cl. 423-245.000.

Harlacher, Eugene A.: *See—*
Britton, Michael W.; Harlacher, Eugene A.; Dew, John N.; and Kleinpeter, Joseph A., 4,175,928, Cl. 48-197.00R.
Dew, John N.; Britton, Michael W.; Harlacher, Eugene A.; and Kleinpeter, Joseph A., 4,176,087, Cl. 252-439.000.

Harland, Philip W., to Ametek, Inc. Gauge assembly. 4,175,444, Cl. 73-738.000.

Harlow Chemical Company Limited: *See—*
Cruden, John M.; Bignold, Alan J.; Green, Roger H.; and Grisenthwaite, Ronald J., 4,176,103, Cl. 260-29.6RW.

Harman International Industries, Inc.: *See—*
Odell, Robert, 4,176,323, Cl. 330-263.000.

Harper, Patrick D., to Bendix Corporation, The. Inductive drive circuit for setting three different levels of load current including a downshift delay. 4,176,387, Cl. 361-154.000.

Harrelson, Albert A., Jr., to Harrelson Rubber Company. Tire retreading method. 4,175,991, Cl. 156-96.000.

Harrelson Rubber Company: *See—*
Harrelson, Albert A., Jr., 4,175,991, Cl. 156-96.000.

Harriman, Anthony; and Porter, George, to National Research Development Corporation. Process for catalytic photo-oxidation of water. 4,176,026, Cl. 204-157.10R.

Harris Corporation: *See—*
Eames, Fred M., 4,176,374, Cl. 358-51.000.

Harris, Stanley R. Radiation reflecting target surface. 4,176,355, Cl. 343-18.00C.

Hart, James E., to Westinghouse Air Brake Company. Continual quick service valve device. 4,175,792, Cl. 303-37.000.

Hartman, Seymour; and Sheridan, Catherine M., to Champion International Corporation. Fire-resistant construction material. 4,176,115, Cl. 260-39.00R.

Hartung, Harold A., to MacAndrews and Forbes Company. Potassium-magnesium-calcium glycyrrhizin. 4,176,228, Cl. 536-4.000.

Harvey, Ronald B., to Pako Corporation. Photographic printer with dichroic filter reset indicators. 4,175,853, Cl. 355-38.000.

Harvey, William J.; McDonough, Thomas B.; and Shaffer, John W., to GTE Sylvania Incorporated. Photoflash unit with two-color indicator. 4,176,389, Cl. 362-5.000.

Hasebe, Sukehiro; and Oyamada, Masanao, to Copal Company Limited. Device for correcting time indication and the like in an electronic clock. 4,175,376, Cl. 58-23.00R.

Hasegawa, Ryozo: *See—*
Asanuma, Akira; Taneda, Nobuo; Hasegawa, Ryozo; Jindai, Shohei; and Morishita, Toshio, 4,176,156, Cl. 422-25.000.

Hashimoto, Harutoshi: *See—*
Asano, Tetsumasa; Yatsuki, Osamu; Fujimoto, Kazuyuki; and Hashimoto, Harutoshi, 4,176,306, Cl. 318-772.000.

Hashimoto, Teiji: *See—*
Iwashita, Tomonori; Takimoto, Hiroyuki; Mashimo, Yukio; and Hashimoto, Teiji, 4,175,845, Cl. 354-173.000.

Hashizume, Akihide; Suzuki, Ryuichi; Yokouchi, Hisatake; Horiuchi, Hideyuki; and Yamamoto, Shinji, to Hitachi, Ltd. Apparatus for automated classification of white blood cells. 4,175,859, Cl. 356-39.000.

Hassall, Cedric H.; Johnson, William H.; and Roberts, Noel A., to Hoffmann-La Roche Inc. Dipeptide derivatives. 4,176,116, Cl. 260-112.50R.

Hassia Verpackung GmbH: *See—*
Walter, Kurt, 4,175,995, Cl. 156-285.000.

Hattori, Junichi: *See—*
Takinishi, Kiyotoshi; and Hattori, Junichi, 4,175,338, Cl. 35-35.00R.

Hattori, Katsuhide; and Takahashi, Masao, to Nippon Oil and Fats Co., Ltd. Water-gel explosive and a method of producing the same. 4,175,990, Cl. 149-21.000.

Hattori, Shinichiro: *See—*
Kamachi, Shinichi; Izawa, Masao; Gocho, Nagahiro; Nakajima, Yoshio; and Hattori, Shinichiro, 4,176,376, Cl. 358-107.000.

Hattori, Tadashi; Takata, Akira; Fukuda, Tamotsu; and Nakase, Takamichi, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Air-fuel ratio adjusting system. 4,175,521, Cl. 123-119.00D.

Haubner, Georg: *See—*
Wesenmeyer, Jurgen; Haubner, Georg; and Meier, Werner, 4,175,508, Cl. 123-117.00R.

Hauni-Werke Korber & Co., KG.: *See—*
Heitmann, Uwe, 4,175,570, Cl. 131-84.00B.

Hauser, Raimund: *See—*
Kittag, Gerd, 4,175,840, Cl. 352-141.000.

Havens, Carl B.: *See—*
Heisterkamp, Herbert W.; and Havens, Carl B., 4,176,155, Cl. 264-564.000.

Hay, Robert A., II; and Boruszewski, John S., to Dow Chemical Company, The. Foam welding apparatus. 4,175,998, Cl. 156-391.000.

Hayashi, Hideo: *See—*
Tsuchiya, Shozo; Hayashi, Hideo; Sasaki, Makoto; Goto, Kiyoshi; and Ihida, Kazuyoshi, 4,176,146, Cl. 525-338.000.

Hayashi, Hisao: *See—*
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawana, Yoshiyuki, 4,176,372, Cl. 357-52.000.

Haydn, Josef: *See—*
Birkenstock, Udo; and Haydn, Josef, 4,176,092, Cl. 252-472.000.

Hayes, Frank F., Jr: *See—*
Hayes, Frank F., Sr.; Hayes, Frank F., Jr; and Hayes, John C., 4,175,315, Cl. 29-453.000.

Hayes, Frank F., Sr.; Hayes, Frank F., Jr; and Hayes, John C. All plastic hinge having a non-rising pin and method of making the same. 4,175,315, Cl. 29-453.000.

Hayes, John C.: *See—*
Hayes, Frank F., Sr.; Hayes, Frank F., Jr; and Hayes, John C., 4,175,315, Cl. 29-453.000.

Hayman, Dennis J., to Wallace-Murray Corporation. Faucet valve with dual flow control. 4,175,586, Cl. 137-614.110.

Hazen Research, Inc.: *See—*
Kindig, James K.; and Turner, Ronald L., 4,175,924, Cl. 44-15.00R.

Hazlett, Robert N., to United States of America, Navy. Coal liquefaction. 4,176,040, Cl. 208-8.0LE.

Heaton, Michael J.; and Quick, James R., to International Paper Company. Process for producing a flowable, highly pigmented, low viscosity, hot-melt coating compound. 4,175,977, Cl. 106-272.000.

Hebert, Jean-Claude. Reusable stopper for sealing containers provided with a beaded neck such as bottles. 4,175,668, Cl. 215-354.000.

Heck, Theodore G. Bridge playing apparatus. 4,175,336, Cl. 35-8.00B.

Heckel, George, to Teletype Corporation. Buffer storage and control. 4,176,400, Cl. 364-900.000.

Heider, Joachim: *See—*
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Heinrich, Oetjen: *See—*
Gutermuth, Paul; Heinrich, Oetjen; and Gutermuth, Paul, Jr., 4,175,935, Cl. 55-269.000.

Heinricher, Mario G.: *See—*
Grabner, Bernd E.; and Heinricher, Mario G., 4,175,974, Cl. 106-58.000.

Heisterkamp, Herbert W.; and Havens, Carl B., to Dow Chemical Company, The. Method and apparatus for making film. 4,176,155, Cl. 264-564.000.

Heitmann, Knut: *See—*
Leitz, Ludwig; Heitmann, Knut; Schneider, Eckart; and Schmidt, Horst, 4,175,365, Cl. 356-4.000.

Heitmann, Uwe, to Hauni-Werke Korber & Co., KG. Apparatus for building a continuous tobacco stream. 4,175,570, Cl. 131-84.00B.

Hempel, Hans-Ulrich; Klueppel, Hans-Jurgen; and Volgnandt, Peter, to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA). Process for the production of silanes from oleic acid esters. 4,176,127, Cl. 260-407.000.

Heners, Jurgen: *See—*
Platz, Rolf; Dockner, Toni; Heners, Jurgen; and Krug, Herbert, 4,176,137, Cl. 260-561.00N.

Hengl, Helmut: *See—*
Ederer, Georg; Fischer, Adolf; Rosche, Paul; Troll, Helmar; Wurst, Wolfgang; Hengl, Helmut; and Seidl, Jiri, 4,175,504, Cl. 123-52.00M.

Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA): *See—*
Hempel, Hans-Ulrich; Klueppel, Hans-Jurgen; and Volgnandt, Peter, 4,176,127, Cl. 260-407.000.

Hennings, Roy: *See—*
Froehlich, Frederick B.; Hennings, Roy; and Schaffer, William J., 4,176,382, Cl. 360-95.000.

Henry, Robert J., to Wood, Harry A., a part interest. Massage back brace. 4,175,548, Cl. 128-24.00R.

Herbert, Timothy J., to Interfix Limited. Bone screw. 4,175,555, Cl. 128-92.00B.

Herborn, Peter E.: *See—*
Ammann, Stephen K.; and Herborn, Peter E., 4,175,854, Cl. 355-54.000.

Herla, Max: *See—*
Voll, Horst; Kessler, Franz; and Herla, Max, 4,175,802, Cl. 308-9.000.

Hermann, Wayne D. Adjustable compass device. 4,175,330, Cl. 33-27.00C.

Hermans, Johny C., to s.a. Texaco Belgium n.v. Bispiperazido phosphorus polyamides. 4,176,226, Cl. 528-332.000.

Hertwig, Waldemar R.: *See—*
Corns, Joseph B.; Nevitt, Thomas D.; and Hertwig, Waldemar R., 4,176,048, Cl. 208-59.000.

Herzog Contracting Corporation: *See—*
Herzog, Stanley M.; and Poggemiller, Randy L., 4,175,902, Cl. 414-339.000.

Herzog, Klaus, to Carl Zeiss-Stiftung. Measuring machine. 4,175,327, Cl. 33-1.00M.

Herzog, Stanley M.; and Poggemiller, Randy L., to Herzog Contracting Corporation. Apparatus for loading and unloading railroad cars. 4,175,902, Cl. 414-339.000.

Hess, John M., III; and Mittleman, Herbert, to Baxter Travenol Laboratories, Inc. Apparatus for administering parenteral liquid in sequential units provided with a ball valve float. 4,175,558, Cl. 128-214.00C.

Hess, Ronald L.: *See—*
Babcock, William E.; and Hess, Ronald L., 4,176,303, Cl. 315-400.000.

Hetherington, Robert D.; and Goelz, David W., to Poly-Glas Systems. Air nucleating spary gun. 4,175,702, Cl. 239-113.000.

Hidano, Tsuyoshi: *See*—
Matsuura, Mitsuaki; Hidano, Tsuyoshi; and Suzuki, Masahiro, 4,175,318, Cl. 29-723.000.

Higa, Teikichi: *See*—
Wilger, John F.; Nakano, Gregory S.; Uyetake, Tadao; Orillo, Stephen, Jr.; and Higa, Teikichi, 4,175,471, Cl. 408-83.500.

Higgins, Michael W. Control system for ram air gliding parachute. 4,175,722, Cl. 244-152.000.

Higgs, Edward W. Automotive battery power circuit breaker. 4,176,284, Cl. 307-10.0BP.

Hildebolt, William M.; and Hundt, Murray T., to Campbell Soup Company. Protein texturization. 4,175,486, Cl. 99-483.000.

Hile, James R., to Carrier Corporation. Capillary plug button. 4,175,402, Cl. 62-263.000.

Hill, Ulderic S. Latch mechanism. 4,175,780, Cl. 292-201.000.

Hills-McCanna Company: *See*—
Priese, Werner K., 4,175,578, Cl. 137-67.000.

Hirano, Masachika: *See*—
Itaya, Nobushige; and Hirano, Masachika, 4,176,189, Cl. 424-273.00R.

Hirayama, Kazuhiro: *See*—
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,175,851, Cl. 355-14.00R.

Hirota, Minoru: *See*—
Inose, Tadao; and Hirota, Minoru, 4,175,477, Cl. 93-36.00A.

Hirschman, Shalom Z. Feminine hygienic pads with improved absorption. 4,175,561, Cl. 128-296.000.

Hitachi, Ltd.: *See*—
Fukushima, Toshihiko; Fujie, Kunio; Arai, Akira; Arai, Nobukatsu; and Kakizaki, Kimio, 4,175,416, Cl. 72-254.000.
Hashizume, Akihide; Suzuki, Ryuichi; Yokouchi, Hisatake; Horiuchi, Hideyuki; and Yamamoto, Shinji, 4,175,859, Cl. 356-39.000.
Inoue, Fumio; and Masuda, Michio, 4,176,302, Cl. 315-397.000.
Kajimura, Takashi; Saito, Kazutoshi; Shige, Noriyuki; Nakamura, Michiharu; Umeda, Jun-ichi; and Kobayashi, Masayoshi, 4,176,325, Cl. 331-94.50H.
Kaneko, Yoichi; and Kimura, Katsuhiro, 4,176,266, Cl. 219-10.55F.
Komatsu, Isamu; Sugawara, Toru; and Yamauchi, Tsukasa, 4,176,288, Cl. 307-252.00A.
Kubota, Masayuki; and Hanano, Masamitu, 4,175,653, Cl. 198-332.000.
Matsumoto, Michiaki; Honda, Juichi; and Mimori, Sadao, 4,175,919, Cl. 431-114.000.
Miyazaki, Michio, 4,176,341, Cl. 340-147.0LP.
Nakamura, Ichiro; Ichiryu, Ken; and Kuwayama, Masatoshi, 4,175,589, Cl. 137-625.640.
Sakamoto, Shinichi; and Sasayama, Takao, 4,175,506, Cl. 123-117.00D.
Satou, Yoshihiko; and Teranishi, Katsuya, 4,175,652, Cl. 198-/332.000.
Watanabe, Yutaka, 4,175,692, Cl. 235-312.000.

Hitachi Shipbuilding & Engineering Co., Ltd.: *See*—
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, 4,176,091, Cl. 252-456.000.

Hoechst Aktiengesellschaft: *See*—
Koch, Manfred; Handte, Reinhard; Horlein, Gerhard; Bieringer, Hermann; and Langeluddeke, Peter, 4,175,947, Cl. 71-88.000.
Kraft, Kurt; and Walz, Gerd, 4,176,143, Cl. 260-835.000.
Lang, Arnold; and Hortig, Hans-Peter, 4,175,934, Cl. 55-267.000.
Loew, Peter; and Hummel, Wolfgang, 4,175,448, Cl. 74-365.000.
Loewe, Heinz; Urbanietz, Josef; Duwel, Dieter; and Kirsch, Reinhard, 4,176,192, Cl. 424-300.000.
Teschner, Eckart; Riedel, Harald; and Sattelmeyer, Richard, 4,175,931, Cl. 51-297.000.

Hoesch Werke Aktiengesellschaft: *See*—
Becker, Dieter; and Stenert, Alois, 4,175,805, Cl. 308-199.000.

Hoffman, Herbert F.: *See*—
Vaughn, Damon A.; and Hoffman, Herbert F., 4,175,762, Cl. 280-78.000.

Hoffman, Mark: *See*—
Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, 4,176,172, Cl. 423-634.000.

Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. Combating pests with N-(aminomethylene)-(monothio and dithio)-phosphoric acid diester-amides. 4,176,181, Cl. 424-211.000.

Hoffmann, Jean-Claude; Castanie, Francis; Crabere, Henri; Verdier, Jean-Pierre; and Voisin, Norbert, to Societe Nationale Industrielle Aerospatiale. Analog noise generator. 4,176,399, Cl. 364-717.000.

Hoffmann-La Roche Inc.: *See*—
Batcho, Andrew D., 4,176,230, Cl. 542-444.000.
Hassall, Cedric H.; Johnson, William H.; and Roberts, Noel A., 4,176,116, Cl. 260-112.50R.
Muller, Jean-Claude; and Ramuz, Henri, 4,176,119, Cl. 260-243.300.

Hofmeister, Helmut: *See*—
Annen, Klaus; Laurent, Henry; Hofmeister, Helmut; Wiechert, Rudolf; Wendt, Hans; and Kapp, Joachim-Friedrich, 4,176,126, Cl. 260-397.450.

Hokari, Saburo: *See*—
Nozawa, Shiyozo; Hokari, Saburo; Yamaga, Shigeru; and Takahashi, Akira, 4,175,846, Cl. 354-173.000.

Holcombe, Thomas C., to Union Carbide Corporation. n-Paraffin - isoparaffin separation process. 4,176,053, Cl. 208-310.00Z.

Holl, Harold H.; and Hupe, Walter R., to Caterpillar Tractor Co. Breather cap. 4,175,671, Cl. 220-235.000.

Holt, Richard C.; Damon, Neil F.; and Hanlon, Richard J., to AUGAT Inc. Electrical interconnection boards with lead sockets mounted therein and method for making same. 4,175,810, Cl. 339-17.00C.

Holt, S. Kent: *See*—
Decker, Carl D.; and Holt, S. Kent, 4,176,202, Cl. 426-574.000.

Homeyer, Bernhard: *See*—
Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, 4,176,181, Cl. 424-211.000.

Honan, Paul R. Intraocular pressure applicator. 4,175,562, Cl. 128-303.00R.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Kasai, Kaname; Mukumoto, Takaji; Asakura, Toshikazu; and Ueda, Ryoji, 4,175,408, Cl. 64-26.000.
Shimada, Shinichi; and Makino, Takenori, 4,175,505, Cl. 123-90.300.

Honda, Juichi: *See*—
Matsumoto, Michiaki; Honda, Juichi; and Mimori, Sadao, 4,175,919, Cl. 431-114.000.

Honeywell Inc.: *See*—
Moravec, Thomas J.; and Skogman, Richard A., 4,176,207, Cl. 427-160.000.
Moravec, Thomas J.; and Skogman, Richard A., 4,176,208, Cl. 427-160.000.
Pearson, Robert P., 4,176,353, Cl. 343-12.00A.

Honeywell Information Systems, Inc.: *See*—
Lee, Ernest P., 4,176,259, Cl. 235-449.000.

Honig, Gunther: *See*—
Schulz, Alfred; Kiencke, Uwe; and Honig, Gunther, 4,176,309, Cl. 323-4.000.

Honig, Helmut: *See*—
Pampouchidis, Georgios; and Honig, Helmut, 4,176,099, Cl. 260-18.0TN.

Hooper, Harold M.: *See*—
Frumerman, Robert; and Hooper, Harold M., 4,175,929, Cl. 48-202.000.

Hore, Lal M.: *See*—
Ramy, Towheed; and Hore, Lal M., 4,176,244, Cl. 174-88.00C.

Horian, James: *See*—
Horian, Richard C.; Horian, James; and Horian, Robert, 4,175,659, Cl. 206-223.000.

Horian, Richard C.; Horian, James; and Horian, Robert. Cleaning kit. 4,175,659, Cl. 206-223.000.

Horian, Robert: *See*—
Horian, Richard C.; Horian, James; and Horian, Robert, 4,175,659, Cl. 206-223.000.

Horii, Hideo: *See*—
Kaiya, Atsushi; Otsuki, Yutaka; and Horii, Hideo, 4,176,109, Cl. 260-31.2MR.

Horiuchi, Hideyuki: *See*—
Hashizume, Akihide; Suzuki, Ryuichi; Yokouchi, Hisatake; Horiuchi, Hideyuki; and Yamamoto, Shinji, 4,175,859, Cl. 356-39.000.

Horlein, Gerhard: *See*—
Koch, Manfred; Handte, Reinhard; Horlein, Gerhard; Bieringer, Hermann; and Langeluddeke, Peter, 4,175,947, Cl. 71-88.000.

Horn, Paul H., to Motorola, Inc. Delta modulation detector. 4,176,321, Cl. 325-325.000.

Horn, Sherrye J. Book index and subject finder. 4,175,777, Cl. 283-42.000.

Horowitz, Harold S.; Longo, John M.; and Lewandowski, Joseph T., to Exxon Research & Engineering Co. Method of making stoichiometric lead and bismuth pyrochlore compounds using an alkaline medium. 4,176,094, Cl. 252-518.000.

Hortig, Hans-Peter: *See*—
Lang, Arnold; and Hortig, Hans-Peter, 4,175,934, Cl. 55-267.000.

Horvath, Zoltan; and Tresch, Erwin, to Cerberus AG. Smoke detector. 4,175,865, Cl. 356-338.000.

Hoshi, Hisao: *See*—
Naganuma, Tsutomu; Hoshi, Hisao; Kumagai, Hiroji; and Yoshida, Kaneki, 4,175,958, Cl. 430-49.000.

Hoshi, Noboru: *See*—
Maekawa, Hideyuki; Noda, Kinzaburo; and Hoshi, Noboru, 4,176,175, Cl. 424-35.000.

Housholder, William R.; and Greer, Norman L. Overpack for nuclear fuel container. 4,175,669, Cl. 220-5.00A.

Howatt, John R., to Charles Stark Draper Laboratory, Inc., The. Apparatus for directly measuring machine tool wear. 4,176,396, Cl. 364-551.000.

Howe, Dennis G., to Eastman Kodak Company. Video disc configuration. 4,176,377, Cl. 358-128.000.

Hsiao, Cheng-Kuo: *See*—
Loutfy, Rafik O.; Hsiao, Cheng-Kuo; and Sharp, James H., 4,175,982, Cl. 136-89.0SJ.

Hsiao, James K.; and Shelton, J. Paul, to United States of America, Navy. Phased-array maintenance-monitoring system. 4,176,354, Cl. 343-17.700.

Hsiung, Du Y.; and Mueller, William H., to Johnson Products Co., Inc. Hair conditioning waving and straightening compositions and methods. 4,175,572, Cl. 132-7.000.

Hubbell, Wayne C.: *See*—
Dimyan, Magid Y.; Hubbell, Wayne C.; Chang, Christopher T. M.; and Linn, John C., 4,176,404, Cl. 365-12.000.

Hudson, Robert H., to Les Jouets Educatifs Universels. Light projector shooting apparatus with movable, perforable, target support. 4,175,747, Cl. 273-101.200.

Huff, Larry D., to RCA Corporation. Toggle mechanism for video disc player. 4,175,751, Cl. 274-13.00R.
Huggins, Homer D., to Modine Manufacturing Company. Heat exchanger device. 4,175,614, Cl. 165-95.000.
Hughes, A. James: *See—*
Nelson, Richard D.; and Hughes, A. James, 4,176,369, Cl. 357-24.000.
Hughes Aircraft Company: *See—*
Buritz, Robert S.; Parker, Robert D.; Kisch, Jack J.; and Burnham, John, 4,176,334, Cl. 336-84.00C.
Forward, Robert L.; and Thurmond, Gary D., 4,176,331, Cl. 333-213.000.
Koppensteiner, Alfred H., 4,175,825, Cl. 350-34.000.
Hughes, Donald W. K., to AMP Incorporated. Connecting means for connecting coil wires to lead wires. 4,175,819, Cl. 339-176.00M.
Hummel, Wolfgang: *See—*
Loew, Peter; and Hummel, Wolfgang, 4,175,448, Cl. 74-365.000.
Humphreys Engineering Company: *See—*
Welker, Merrill, 4,175,591, Cl. 137-883.000.
Hundt, Eckart: *See—*
Tischer, Peter; and Hundt, Eckart, 4,176,281, Cl. 250-492.00A.
Hundt, Murray T.: *See—*
Hildebolt, William M.; and Hundt, Murray T., 4,175,486, Cl. 99-483.000.
Hung, John H., to International Paper Company. Polymeric sheets. 4,175,557, Cl. 128-156.000.
Hunter, Bradley L., to Teradyne, Inc. Electrical connector. 4,175,821, Cl. 339-258.00R.
Hunter, Wood E.: *See—*
Buckman, John D.; Hunter, Wood E.; Pera, John D.; and Taylor, Robert M., 4,176,107, Cl. 260-29.60E.
Hupe, Walter R.: *See—*
Holl, Harold H.; and Hupe, Walter R., 4,175,671, Cl. 220-235.000.
Husher, Lee K.; Weber, Heinrich; and Tippmer, Kurt, to United States Steel Corporation. Process for the separation of foam from effluents of coke oven plants. 4,176,062, Cl. 210-72.000.
Husted, Royce H., to Saroy Engineering. Propulsion system for a snow going device. 4,175,627, Cl. 180-190.000.
Hyma, Marvin J.: *See—*
Muzechuk, Richard A.; and Hyma, Marvin J., 4,175,771, Cl. 280-696.000.
Iaboni, Albert; and Iaboni, Biagio. Grass bag clamp and spreader. 4,175,603, Cl. 150-4.000.
Iaboni, Biagio: *See—*
Iaboni, Albert; and Iaboni, Biagio, 4,175,603, Cl. 150-4.000.
Iby, Jack. Tent. 4,175,576, Cl. 135-1.00A.
Ichikawa, Singo, to Citizen Watch Co. Ltd. Timepiece with display device for warning battery life. 4,175,377, Cl. 58-23.0BA.
Ichiki, Masayoshi: *See—*
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, 4,176,091, Cl. 252-456.000.
Ichiryu, Ken: *See—*
Nakamura, Ichiro; Ichiryu, Ken; and Kuwayama, Masatoshi, 4,175,589, Cl. 137-625.640.
Ide, Akira; and Matsumoto, Sojiro, to Asahi Kasei Kogyo Kabushiki Kaisha. Reaction of organic diisocyanates with water. 4,176,132, Cl. 260-453.00A.
Idel, Vladimir V., to Mukachevsky Stankostroitelny Zavod Imeni S.M. Kirova. Machine for the mechanical working of band saws. 4,175,452, Cl. 76-25.00R.
Ihida, Kazuyoshi: *See—*
Tsuchiya, Shozo; Hayashi, Hideo; Sasaki, Makoto; Goto, Kiyoshi; and Ihida, Kazuyoshi, 4,176,146, Cl. 525-338.000.
Iida Kensetsu Co., Ltd.: *See—*
Ijima, Takeshi, 4,175,888, Cl. 405-31.000.
Iizumi, Tomomitsu, to Shoketsu Kinzoku Kogyo Kabushiki Kaisha. Fluid circuit. 4,175,473, Cl. 91-443.000.
Ijima, Takeshi, to Iida Kensetsu Co., Ltd. Block for constructing breakwater. 4,175,888, Cl. 405-31.000.
Ikeda, Hiroharu; Matsumoto, Shuichi; and Makino, Kenya, to Japan Synthetic Rubber Co., Ltd. Catalyst composition for ring-opening polymerization of norbornene derivatives and process for polymerizing same. 4,176,220, Cl. 526-97.000.
Ikeda, Teppei: *See—*
Uchida, Toshio; Yabuta, Yorimiti; and Ikeda, Teppei, 4,175,964, Cl. 430-253.000.
Ikeda, Tomoaki: *See—*
Shinozaki, Fumiaki; Washigawa, Yasuo; Ikeda, Tomoaki; Nakao, Sho; and Kondoh, Syunichi, 4,175,971, Cl. 430-287.000.
Imperial Chemical Industries Limited: *See—*
Cinderey, Michael B.; and Rose, John B., 4,176,222, Cl. 528-126.000.
Waring, Wilson S., 4,176,194, Cl. 424-309.000.
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, to Hitachi Shipbuilding & Engineering Co., Ltd. Denitrating catalysts having porous coating and process for producing same. 4,176,091, Cl. 252-456.000.
Inami, Yasuhiko: *See—*
Yano, Kohzo; Inami, Yasuhiko; and Uede, Hisashi, 4,175,837, Cl. 350-357.000.
Inanaga, Kiyofumi; Egawa, Saburo; Shimizu, Akio; and Maeda, Keijiro, to Sony Corporation. Deleterious mechanical vibrations from dynamic loudspeaker offset by additional dynamic device. 4,176,249, Cl. 179-1.00E.
Inose, Tadao; and Hirota, Minoru. Plate type punching machine. 4,175,477, Cl. 93-36.00A.
Inoue, Fumio; and Masuda, Michio, to Hitachi, Ltd. Vertical deflection output circuit. 4,176,302, Cl. 315-397.000.
Inoue, Makoto, to Sony Corporation. Method for manufacturing an oxide of semiconductor. 4,176,206, Cl. 427-82.000.
Inoue, Tatsuya: *See—*
Kawabe, Naoshi; Kaji, Hisatsugu; Miwa, Naotaka; Nakanishi, Hajime; Tanaka, Fumiaki; and Inoue, Tatsuya, 4,175,708, Cl. 241-16.000.
Inpro, Inc.: *See—*
Orlowski, David C., 4,175,752, Cl. 277-53.000.
INTEL Corporation: *See—*
Jackson, Daniel K., 4,176,258, Cl. 235-302.000.
Interfix Limited: *See—*
Herbert, Timothy J., 4,175,555, Cl. 128-92.00B.
Interlake, Inc.: *See—*
Garthus, Donald R.; and Robinson, L. T., 4,176,013, Cl. 202-242.000.
International Business Machines Corporation: *See—*
Colglazier, Donald F.; Fallon, John L.; Kimble, George P.; and Mares, Fred R., 4,175,741, Cl. 271-3.100.
Froehlich, Frederick B.; Hennings, Roy; and Schaffer, William J., 4,176,382, Cl. 360-95.000.
Koski, John A.; and Weaver, Richard B., 4,176,380, Cl. 360-50.000.
Wing, James W., 4,175,878, Cl. 400-693.000.
International Cold Forging Corporation: *See—*
Grandclement, Gerard, 4,175,590, Cl. 137-883.000.
International Flavors & Fragrances Inc.: *See—*
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick L.; and Vock, Manfred H., 4,175,569, Cl. 131-9.000.
International Harvester Company: *See—*
Bouet, Jacques E., 4,175,367, Cl. 56-295.000.
Cicci, George B., 4,175,366, Cl. 56-15.800.
International Paper Company: *See—*
Heaton, Michael J.; and Quick, James R., 4,175,977, Cl. 106-272.000.
Hung, John H., 4,175,557, Cl. 128-156.000.
International Telephone & Telegraph Corp.: *See—*
DeRosa, Louis A.; and Rogoff, Mortimer, 4,176,316, Cl. 325-32.000.
Irwin, Robert S., to Du Pont de Nemours, E. I., and Company. Polyimide-esters and filaments prepared from 4-(4'-carboxyphthalimido)-benzoic acid or 4-(4'-hydroxyphthalimido)phenol. 4,176,223, Cl. 528-170.000.
Ishida, Akira; and Yamada, Hajime, to Nippon Telegraph and Telephone Public Corporation. Superconductive Josephson circuit device. 4,176,290, Cl. 307-306.000.
Ishida, Yasuhiko: *See—*
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,175,386, Cl. 60-276.000.
Ishii, Kiminori; and Nishizawa, Katsuhiko, to Nissan Motor Co., Ltd. Heat absorption means operative at prescribed temperature for suppression of heat transfer from abnormally heated automotive exhaust system to article on board. 4,175,631, Cl. 180-309.000.
Ishikawa, Tsunezo: *See—*
Makino, Kenya; Ishikawa, Tsunezo; and Komatsu, Koei, 4,176,219, Cl. 526-92.000.
Isuzu Motors Limited: *See—*
Kawamura, Hideo; Ohta, Hideo; and Kubota, Kimi, 4,175,522, Cl. 123-119.00A.
Itaya, Nobushige; and Hirano, Masachika, to Sumitomo Chemical Company, Limited. Insecticidal and acaricidal hydantoin N-methylol esters. 4,176,189, Cl. 424-273.00R.
ITI Limited: *See—*
Mougin, Georges L., 4,175,887, Cl. 405-25.000.
Ito, Fumio: *See—*
Murakami, Hiroyashu; Ito, Tadashi; Ito, Fumio; Sakurada, Nobuaki; Kawamura, Masaharu; and Shinoda, Nobuhiko, 4,175,848, Cl. 354-289.000.
Sakurada, Nobuaki; Ito, Tadashi; Shinoda, Nobuhiko; Ito, Fumio; Murakami, Hiroyashu; and Kawamura, Masaharu, 4,175,842, Cl. 354-23.00D.
Ito, Hiromi: *See—*
Fujie, Tetsuo; and Ito, Hiromi, 4,176,273, Cl. 219-220.000.
Ito, Masaharu, to Canon Kabushiki Kaisha. Photographic lens assembly. 4,175,831, Cl. 350-255.000.
Ito, Tadashi: *See—*
Murakami, Hiroyashu; Ito, Tadashi; Ito, Fumio; Sakurada, Nobuaki; Kawamura, Masaharu; and Shinoda, Nobuhiko, 4,175,848, Cl. 354-289.000.
Sakurada, Nobuaki; Ito, Tadashi; Shinoda, Nobuhiko; Ito, Fumio; Murakami, Hiroyashu; and Kawamura, Masaharu, 4,175,842, Cl. 354-23.00D.
Ito, Toshimitsu: *See—*
Sanada, Masakatsu; Ito, Toshimitsu; and Nakada, Masahiko, 4,175,527, Cl. 123-136.000.
Itoki Kosakusho Co., Ltd.: *See—*
Tabata, Yoichi, 4,175,901, Cl. 414-282.000.
Iwako, Hiroyuki; and Ando, Shigeki, to Funken Co., Ltd. Process and apparatus for mechanically mixing two immiscible liquids and one or more other substances. 4,175,873, Cl. 366-165.000.
Iwanicki, Douglas W. Ice thickness indicator. 4,175,512, Cl. 116-217.000.
Iwase, Kazuo: *See—*
Kawai, Hisasi; and Iwase, Kazuo, 4,175,507, Cl. 123-117.00D.

Iwashita, Tomonori; Takimoto, Hiroyuki; Mashimo, Yukio; and Hashimoto, Teiji, to Canon Kabushiki Kaisha. Winding up device of a camera. 4,175,845, Cl. 354-173.000.

Iwata, Takeshi: *See—*
Ohno, Shigeaki; Kazuta, Toshiyuki; and Iwata, Takeshi, 4,176,135, Cl. 260-554.000.

Izawa, Masao: *See—*
Kamachi, Shinichi; Izawa, Masao; Gocho, Nagahiro; Nakajima, Yoshio; and Hattori, Shinichiro, 4,176,376, Cl. 358-107.000.

J. Bobst & Fils, S.A.: *See—*
Lang, Pierre, 4,175,686, Cl. 225-97.000.

J. I. Case Company: *See—*
Christensen, Robert F., 4,175,638, Cl. 180-140.000.
Stoychoff, Terry A., 4,175,598, Cl. 144-34.00E.

Jackisch, Philip F., to Ethyl Corporation. Diesel engine crankcase lubricating oil composition. 4,176,072, Cl. 252-32.70E.

Jackson, Daniel K., to INTEL Corporation. Method and circuit for checking integrated circuit chips. 4,176,258, Cl. 235-302.000.

Jackson, Henry G., to Phillips Petroleum Company. C-shaped polyester filaments. 4,176,211, Cl. 428-397.000.

Jacobs, Morris L.; and Dunagan, Hiram J. Binding hole punch apparatus. 4,175,457, Cl. 83-230.000.

Jacobson, Carl C.; and Crosby, Gaius P., to Crafco, Inc. Pavement cutting machine. 4,175,788, Cl. 299-1.000.

James, Granville C., to Coal Industry (Patents) Limited. Dust filter apparatus. 4,175,933, Cl. 55-259.000.

Japan Synthetic Rubber Co., Ltd.: *See—*
Ikeda, Hiroharu; Matsumoto, Shuichi; and Makino, Kenya, 4,176,220, Cl. 526-97.000.
Makino, Kenya; Ishikawa, Tsunezo; and Komatsu, Koei, 4,176,219, Cl. 526-92.000.

Jaquay, Louis H., to Dravo Corporation. Melting of fine particulate material in a high-speed rotary furnace. 4,175,732, Cl. 266-213.000.

Jarret, Jacques H.; and Jarret, Jean M. B. Hydraulic inertia filled spring. 4,175,733, Cl. 267-126.000.

Jarret, Jean M. B.: *See—*
Jarret, Jacques H.; and Jarret, Jean M. B., 4,175,733, Cl. 267-126.000.

JBC Enterprises, Inc.: *See—*
Phaup, Charles W.; and Lower, Joseph D., 4,175,889, Cl. 405-195.000.

Jeffers, Eldon L.: *See—*
United States of America, National Aeronautics and Space Administration; Jeffers, Eldon L.; and Thomas, Richard R., 4,176,007, Cl. 435-34.000.

Jeghers, Philippe M.: *See—*
Gevers, Georges A.; and Jeghers, Philippe M., 4,175,745, Cl. 273-73.00C.

Jenkins, David K., to Rockwell International Corporation. Lubricating system for power transmitting apparatus. 4,175,643, Cl. 184-11.00A.

Jenz, Siegfried: *See—*
Pabst, Rolf; and Jenz, Siegfried, 4,175,616, Cl. 165-107.00D.

Jeppson, Morris R., to Laurmann, Giselle V.; Blurton, Richard R.; and Blurton, Claire M., part interest to each. Methods for sealing and resealing concrete using microwave energy. 4,175,885, Cl. 404-77.000.

Jernigan, Robert T.; and Sheffield, Byford D., to Dow Chemical Company, The. Process for converting alkali metal iodates to periodates. 4,176,167, Cl. 423-476.000.

Jersey Nuclear-Avco Isotopes, Inc.: *See—*
Aldag, Henry R.; Morton, Richard G.; and Woodroffe, Jaime A., 4,176,324, Cl. 331-94.50T.

Jervis B. Webb Company: *See—*
Dehne, Clarence A.; and Pachuta, Martin, 4,175,657, Cl. 198-833.000.

Jillie, Don W., Jr., to Sperry Rand Corporation. Subminiature bore and conductor formation. 4,176,029, Cl. 204-192.00S.

Jindai, Shohei: *See—*
Asanuma, Akira; Taneda, Nobuo; Hasegawa, Ryozo; Jindai, Shohei; and Morishita, Toshio, 4,176,156, Cl. 422-25.000.

Jobst, Wolfgang: *See—*
Mobus, Dietmar; Ehrenberger, Gunter; and Jobst, Wolfgang, 4,176,265, Cl. 200-316.000.

Johansson, Bengt A., to Centro-Maskin Goteborg AB. Method and a device for initiating an oxygen deseaming process. 4,175,984, Cl. 148-9.500.

John, Heinrich: *See—*
Kourimsky, Friedrich J. A.; and John, Heinrich, 4,175,818, Cl. 339-176.0MP.

John, Peter; Feichtner, Wolfgang; Graf, Werner; and Frey, Volker, to Wacker-Chemie GmbH. Process for preparing acyloxysilanes and acyloxysiloxanes. 4,176,130, Cl. 260-448.20E.

Johnson, Arven; and Stapleton, Willene, to Stapleton, John O., a part interest. Smoke alarm network. 4,176,346, Cl. 340-524.000.

Johnson, Brian G. Vibration device. 4,175,552, Cl. 128-32.000.

Johnson, Edward E., to Auto-Miser International Manufacturing Corp. Fuel vaporizer system for internal combustion engines. 4,175,525, Cl. 123-134.000.

Johnson, Everett M., to Texaco Inc. Shaft bearing wear measuring apparatus. 4,175,331, Cl. 33-172.00E.

Johnson, Gary E., to Johnson Propeller Company. Propeller nut. 4,175,605, Cl. 151-7.000.

Johnson, George C., to Mobil Oil Corporation. Removal of fluorine during production of fertilizer. 4,175,944, Cl. 71-39.000.

Johnson, Irvin D.: *See—*
Bruce, Charles R.; Johnson, Irvin D.; and McGrievy, Lawrence H., 4,176,052, Cl. 208-131.000.

Johnson, James A.; and Kerfoot, Paul E., to Motorola, Inc. Radio transmi .er display indicator. 4,176,318, Cl. 325-133.000.

Johnson, John L., Jr.: *See—*
Coil, Donald A.; Johnson, John L., Jr.; and Swinland, Horace J., 4,175,801, Cl. 308-23.000.

Johnson & Johnson: *See—*
Jones, Robin F., 4,175,953, Cl. 75-134.00F.

Johnson, Joseph E.; and Dombrowski, Edward, to Westinghouse Electric Corp. Method for modifying the characteristics of a semiconductor fusions. 4,176,004, Cl. 156-643.000.

Johnson Products Co., Inc.: *See—*
Hsiung, Du Y.; and Mueller, William H., 4,175,572, Cl. 132-7.000.

Johnson Propeller Company: *See—*
Johnson, Gary E., 4,175,605, Cl. 151-7.000.

Johnson, Ralph W.; Burrs, Emil D.; Smith, Gary L.; Freund, Ronald G.; and Patula, Edward, to Total Systems, Inc. Device for singular dispensing of packaged articles. 4,175,674, Cl. 221-88.000.

Johnson, Roger P. Motorcycle wheel suspension device. 4,175,764, Cl. 280-284.000.

Johnson, William H.: *See—*
Hassall, Cedric H.; Johnson, William H.; and Roberts, Noel A., 4,176,116, Cl. 260-112.50R.

Johnston, William T.; and Barker, N. Glen. Vibrator for dumping vehicle. 4,175,906, Cl. 414-469.000.

Jones, Robin F., to Johnson & Johnson. Non-precious dental alloy of Co-Ni-Cr containing Si and B. 4,175,953, Cl. 75-134.00F.

Jones, S. E. Diagnostic skills test. 4,175,339, Cl. 35-48.00A.

Jordaan, Pieter J.; and van Deventer, Jacobus P., to Triomf Fertilizers. Water-soluble fertilizers. 4,175,943, Cl. 71-29.000.

Jordan, Edgar R. Valve deactivator for internal combustion engines. 4,175,534, Cl. 123-198.00F.

Jores, Willi, to AGFA-Gevaert, A.G. Continuously operating automatic strip winding device. 4,175,713, Cl. 242-56.00R.

Jorgensen, Niels, to Aktieselskabet Funki Maskinfabrik. Stop device to be used in automatic feeding systems. 4,175,596, Cl. 141-18.000.

Jost, Max: *See—*
Wick, Arnold; and Jost, Max, 4,176,113, Cl. 260-40.00P.

Judge, John S.: *See—*
Baker, Thomas E.; Fix, George L.; and Judge, John S., 4,176,209, Cl. 427-248.00B.

Juedes, Dennis L.: *See—*
Guerre, Robert P.; Juedes, Dennis L.; and Ruland, Ross R., 4,175,920, Cl. 431-175.000.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Fukuhara, Toshihiko, 4,175,447, Cl. 73-799.000.

Kabushiki Kaisha Morita Sanshoku: *See—*
Arai, Toshio, 4,175,324, Cl. 433-122.000.

Kabushiki Kaisha Seikosha: *See—*
Yoshizawa, Keiichi, 4,175,374, Cl. 58-23.00R.

Kabushiki Kaisha Suwa Seikosha: *See—*
Hanaoka, Seiji, 4,175,876, Cl. 400-124.000.
Minowa, Masahiro, 4,175,488, Cl. 101-99.000.

Kacal, Gary W.; and Partridge, Charles C., to ACF Industries, Incorporated. Means and method for in-line removal of seat rings in ball valves. 4,175,577, Cl. 137-15.000.

Kage, Henning: *See—*
Metz, Hellmut; and Kage, Henning, 4,176,069, Cl. 210-321.00B.

Kahn, Leonard R. Double sideband transmission system. 4,176,319, Cl. 325-138.000.

Kaiya, Atsushi; Otsuki, Yutaka; and Horii, Hideo, to Nippon Oil Co., Ltd. Water-soluble coating composition. 4,176,109, Cl. 260-31.2MR.

Kaji, Hisatsugu: *See—*
Kawabe, Naoshi; Kaji, Hisatsugu; Miwa, Naotaka; Nakanishi, Hajime; Tanaka, Fumiaki; and Inoue, Tatsuya, 4,175,708, Cl. 241-16.000.

Kajimura, Takashi; Saito, Kazutoshi; Shige, Noriyuki; Nakamura, Michiharu; Umeda, Jun-ichi; and Kobayashi, Masayoshi, to Hitachi, Ltd. Semiconductor laser device. 4,176,325, Cl. 331-94.50H.

Kakizaki, Kimio: *See—*
Fukushima, Toshihiko; Fujie, Kunio; Arai, Akira; Arai, Nobukatsu; and Kakizaki, Kimio, 4,175,416, Cl. 72-254.000.

Kalajzich, Albert A., to General Engines Co., Inc. Electric drive unit for vehicles. 4,175,629, Cl. 180-220.000.

Kalbfleisch, Adolphe W. Bottom entry positive acting ball valve. 4,175,580, Cl. 137-315.000.

Kalsi, Swarn S.; and Chari, Madabushi V. K., to Electric Power Research Institute, Inc. Auxiliary field winding for a superconductive alternating current electrical machine and method of exciting same. 4,176,292, Cl. 310-52.000.

Kaltenbach & Voigt GmbH & Co.: *See—*
Eibofner, Eugen; and Balsys, Heinz, 4,175,323, Cl. 433-126.000.

Kamachi, Shinichi; Izawa, Masao; Gocho, Nagahiro; Nakajima, Yoshio; and Hattori, Shinichiro, to Olympus Optical Company Limited. Image processing system. 4,176,376, Cl. 358-107.000.

Kaman Sciences Corporation: *See—*
Schneider, John C.; Hanson, S. Eugene; and DuVall, Bruce W., 4,175,443, Cl. 73-722.000.

Kamino, Yasumi: *See—*
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, 4,176,091, Cl. 252-456.000.

Kaminski, David G.; Fedde, Mickiel P.; and DeWard, Robert C., to Sperry Rand Corporation. Apparatus for maintaining a history of the

most recently executed instructions in a digital computer. 4,176,394, Cl. 364-200.000.
Kamo, Hisao: *See*—
Aoki, Kiyoshi; and Kamo, Hisao, 4,175,317, Cl. 29-571.000.
Kamon, John T.: *See*—
Ponce, Phillip; and Kamon, John T., 4,175,679, Cl. 222-70.000.
Kamp, Heinz, to W. Schlafhorst & Co. Device for withdrawing and transporting a wound coil away from a winding device for textile filaments. 4,175,711, Cl. 242-35.50A.
Kaneko, Yoichi; and Kimura, Katsuhiro, to Hitachi, Ltd. Microwave heating apparatus. 4,176,266, Cl. 219-10.55F.
Kaneko, Yutaka: *See*—
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kaneko, Yutaka; and Kawasaki, Mikio, 4,175,966, Cl. 430-438.000.
Kanojia, Ramesh M.; Wachter, Michael P.; and Chen, Robert H. K., to Ortho Pharmaceutical Corp. Utero-evacuants. 4,176,188, Cl. 424-270.000.
Kapp, Joachim-Friedrich: *See*—
Annen, Klaus; Laurent, Henry; Hofmeister, Helmut; Wiechert, Rudolf; Wendt, Hans; and Kapp, Joachim-Friedrich, 4,176,126, Cl. 260-397.450.
Karam, Ronald E.; and Swarthout, David J., to Xerox Corporation. Precipitation of particulate trigonal selenium for use in electrophotography. 4,175,959, Cl. 430-134.000.
Karl Schmidt GmbH: *See*—
Moebus, Horst, 4,175,502, Cl. 123-41.350.
Karlsson, Per-Olle, to Svenskt Stal Aktiebolag. Method and apparatus for producing metal blanks, in particular steel slabs, which at least in a predetermined surface area have substantially no defects. 4,175,729, Cl. 266-51.000.
Kasahara, Tadashi, to Konishiroku Photo Industry Co., Ltd. Ink jet printing apparatus. 4,176,363, Cl. 346-140.00R.
Kasai, Kaname; Mukumoto, Takaji; Asakura, Toshikazu; and Ueda, Ryoji, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for absorbing oil pressure in an impact type tool. 4,175,408, Cl. 64-26.000.
Kasper, Horst M.; Tell, Benjamin; and Wagner, Sigurd, to Bell Telephone Laboratories, Incorporated. Ternary ionic conductors. 4,176,170, Cl. 423-508.000.
Kast, Hellmut, to BASF Aktiengesellschaft. Basic dyes. 4,176,229, Cl. 542-422.000.
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas purification apparatus for an internal combustion engine. 4,175,386, Cl. 60-276.000.
Kato, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Combustion chamber of an internal combustion engine. 4,175,532, Cl. 123-191.00S.
Kaufman, Robert J.: *See*—
Franz, John E.; and Kaufman, Robert J., 4,175,946, Cl. 71-87.000.
Kaul, Dietmar; and Willhelm, Joerg, to Ernst Leitz Wetzlar GmbH. Photoelectric incident light distance measuring device. 4,176,276, Cl. 250-237.00G.
Kaushal, Som N.: *See*—
Ewalt, Leonard J.; and Kaushal, Som N., 4,175,986, Cl. 148-16.500.
Kawabe, Naoshi; Kaji, Hisatsugu; Miwa, Naotaka; Nakanishi, Hajime; Tanaka, Fumiaki; and Inoue, Tatsuya, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method of transporting liquid pitch containing lumpy cokes and apparatus therefor. 4,175,708, Cl. 241-16.000.
Kawada, Hiroh; Goto, Kiyoshi; and Kurita, Yoshio, to Konishiroku Photo Industry Co., Ltd. Ink composition for ink jet printing. 4,176,361, Cl. 346-1.100.
Kawai, Hisasi; and Iwase, Kazuo, to Nippon Soken, Inc. Electronic ignition timing control system for internal combustion engine. 4,175,507, Cl. 123-117.00D.
Kawai Musical Instrument Mfg. Co. Ltd.: *See*—
Deutsch, Ralph, 4,175,463, Cl. 84-1.190.
Deutsch, Ralph, 4,175,464, Cl. 84-1.240.
Kawamura, Hideo; Ohta, Hideo; and Kubota, Kimi, to Isuzu Motors Limited. Exhaust gas recirculation device for internal combustion engine with auxiliary combustion chamber. 4,175,522, Cl. 123-119.00A.
Kawamura, Masaharu. *See*—
Murakami, Hiroyashu; Ito, Tadashi; Ito, Fumio; Sakurada, Nobuaki; Kawamura, Masaharu; and Shinoda, Nobuhiko, 4,175,848, Cl. 354-289.000.
Sakurada, Nobuaki; Ito, Tadashi; Shinoda, Nobuhiko; Ito, Fumio; Murakami, Hiroyashu; and Kawamura, Masaharu, 4,175,842, Cl. 354-23.00D.
Kawana, Yoshiyuki: *See*—
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawana, Yoshiyuki, 4,176,372, Cl. 357-52.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Terai, Kiyohide; and Kutsuna, Muneharu, 4,176,271, Cl. 219-121.0EM.
Kawasaki Kasei Chemicals Ltd.: *See*—
Matsuura, Ryo; Nakatani, Shuichi; Nomiyama, Yukio; and Ninomiya, Tadashi, 4,176,125, Cl. 260-369.000.
Kawasaki, Mikio: *See*—
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kaneko, Yutaka; and Kawasaki, Mikio, 4,175,966, Cl. 430-438.000.
Kawasumi Laboratories, Inc.: *See*—
Sakurada, Yutaka; Sunahara, Kimihisa; and Yamauchi, Kazuhisa, 4,176,070, Cl. 210-500.00M.
Kay Tex Products, Inc.: *See*—
Rider, Nathan R., 4,176,100, Cl. 260-22.00R.
Kazmark, Eugene A. Portable luggage carrier. 4,175,769, Cl. 280-654.000.
Kazuta, Toshiyuki: *See*—
Ohno, Shigeaki; Kazuta, Toshiyuki; and Iwata, Takeshi, 4,176,135, Cl. 260-554.000.
Keck, Roland, to Betriesbsforschungsinstitut VDEh Institut fur angewandte Forschung GmbH. Device for the measurement of forces or pressures. 4,175,429, Cl. 73-141.00A.
Kelley, Joseph A. Waste paper recycling. 4,176,054, Cl. 209-8.000.
Kellner, Helmut. Arrangement for producing photographic pictures suitable for photogrammetric survey of spatial objects. 4,175,328, Cl. 33-1.00A.
Kellwood Company: *See*—
Conner, William R., Jr., 4,175,763, Cl. 280-104.000.
Kemp Applications Sales Limited: *See*—
Kemp, Jack V. L., 4,175,739, Cl. 270-58.000.
Kemp, Jack V. L., to Kemp Applications Sales Limited. Paper collating machines. 4,175,739, Cl. 270-58.000.
Kendall Company, The: *See*—
Patel, Bhupendra C., 4,175,567, Cl. 128-748.000.
Peterson, James J., 4,175,597, Cl. 141-23.000.
Kenworthy, Grant F., to Weber Marking Systems, Inc. Uniform indexing of paper forms. 4,175,687, Cl. 226-74.000.
Keogh, Raymond J.: *See*—
Burr, Robert P.; Morino, Ronald; and Keogh, Raymond J., 4,175,816, Cl. 339-95.00R.
Keresztes, Borbala nee Ordog: *See*—
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.
Kerfoot, Paul E.: *See*—
Johnson, James A.; and Kerfoot, Paul E., 4,176,318, Cl. 325-133.000.
Kessler, Franz: *See*—
Voll, Horst; Kessler, Franz; and Herla, Max, 4,175,802, Cl. 308-9.000.
Khair, Magdi K.: *See*—
Chadwick, Alexander; Khair, Magdi K.; and McCombie, Jay C., 4,175,587, Cl. 137-625.650.
Kida, Masashi: *See*—
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,175,386, Cl. 60-276.000.
Kidd, Arthur H., to H. G. Weber & Co., Inc. Method and apparatus for forming reinforced top file folders. 4,175,476, Cl. 93-1.00E.
Kiemle, Horst: *See*—
Pekau, Dietlind; Ruell, Hartwig; Storck, Eckhard; and Kiemle, Horst, 4,175,823, Cl. 350-3.790.
Kiencke, Uwe: *See*—
Schulz, Alfred; Kiencke, Uwe; and Honig, Gunther, 4,176,309, Cl. 323-4.000.
Kikuchi, Toshiaki: *See*—
Nakazawa, Koji; Kikuchi, Toshiaki; and Fujita, Toshihito, 4,175,939, Cl. 65-2.000.
Kilgore, Doyle G. Cat proof pigeon trap. 4,175,517, Cl. 119-155.000.
Kimble, George P.: *See*—
Colglazier, Donald F.; Fallon, John L.; Kimble, George P.; and Mares, Fred R., 4,175,741, Cl. 271-3.100.
Kimura, Katsuhiro: *See*—
Kaneko, Yoichi; and Kimura, Katsuhiro, 4,176,266, Cl. 219-10.55F.
Kindig, James K.; and Turner, Ronald L., to Hazen Research, Inc. Treatment of coal with metal containing compounds. 4,175,924, Cl. 44-15.00R.
King, Olin B., to SCI Systems, Inc. Grounding device for rotary electrical printer and method. 4,176,364, Cl. 346-162.000.
Kinsey, Cletus M.: *See*—
Davis, Billy J.; Kinsey, Cletus M.; Shen, Hwa J.; and Weber, James R., 4,175,799, Cl. 308-9.000.
Kirchner, Richard K.; Mayer, William N.; and Andreadakis, Nicholas C., to Modern Controls, Inc. Display panel apparatus and method of driving. 4,176,298, Cl. 315-169.200.
Kirsch, Reinhard: *See*—
Loewe, Heinz; Urbanietz, Josef; Duwel, Dieter; and Kirsch, Reinhard, 4,176,192, Cl. 424-300.000.
Kisch, Jack J.: *See*—
Buritz, Robert S.; Parker, Robert D.; Kisch, Jack J.; and Burnham, John, 4,176,334, Cl. 336-84.00C.
Kishinami, Tateshi; and Sato, Makoto, to Toshiba Tungaloy Co., Ltd.; and Makino Milling Machine Co., Ltd. Ball endmill. 4,175,896, Cl. 408-230.000.
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, to Canon Kabushiki Kaisha. Recording position adjuster. 4,175,851, Cl. 355-14.00R.
Kittag, Gerd, to Vockenhuber, Karl; and Hauser, Raimund. Motion picture camera with multiple exposure. 4,175,840, Cl. 352-141.000.
Kleen-Rite, Inc.: *See*—
Smith, Robert G., 4,175,666, Cl. 211-71.000.
Kleim, Karl-Heinz, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Entrance step arrangement for a short distance transport vehicle. 4,175,495, Cl. 105-450.000.
Kleinpeter, Joseph A.: *See*—
Britton, Michael W.; Harlacher, Eugene A.; Dew, John N.; and Kleinpeter, Joseph A., 4,175,928, Cl. 48-197.00R.

Dew, John N.; Britton, Michael W.; Harlacher, Eugene A.; and Kleinpeter, Joseph A., 4,176,087, Cl. 252-439.000.

Klenk, Emil, to Maschinenbau Oppenweiler GmbH. Folding machine. 4,175,740, Cl. 270-83.000.

Klinedinst, Keith A.; and Schlaikjer, Carl R., to GTE Laboratories Incorporated. Lithium-lead sulfate primary electrochemical cell. 4,176,214, Cl. 429-194.000.

Klippan GmbH Sicherheitsgerate: *See*—
Muskat, Kurt (Ulrich), 4,175,787, Cl. 297-484.000.

Klueppel, Hans-Jurgen: *See*—
Hempel, Hans-Ulrich; Klueppel, Hans-Jurgen; and Volgnandt, Peter, 4,176,127, Cl. 260-407.000.

Knaflic, France: *See*—
Eckert, Guenter; Knaflic, France; Miller, Franz-Friedrich; and Zissel, Alfred, 4,175,922, Cl. 8-94.160.

Knappstein, Johannes, to Carl Still, Firma. Method for operating coke oven chambers in connection with a predrying plant for the coal. 4,176,011, Cl. 201-40.000.

Knappworst, Jurgen; Brede, Uwe; and Zeiher, Erich, to Dynamit Nobel, AG. Projectile, particularly for hand firearms and long firearms. 4,175,492, Cl. 102-92.600.

Knell, Harvey A.; and Gill, Stephen H., to Caterpillar Tractor Co. Shovel linkage. 4,175,907, Cl. 414-715.000.

Knight, John C.; and Wovcha, Merle G., to Upjohn Company, The. Steroid intermediates. 4,176,123, Cl. 260-345.200.

Knoll, Ernst, to Paul Hartmann AG; Knoll, Ernst; and Thieme, Werner. Swab. 4,175,560, Cl. 128-269.000.

Knorring, Richard T., to Cincinnati Milacron-Heald Corporation. Finishing tool. 4,175,415, Cl. 72-101.000.

Kobayashi, Hideo: *See*—
Goto, Kenji; Yokota, Masato; and Kobayashi, Hideo, 4,175,533, Cl. 123-191.00S.

Kobayashi, Masayoshi: *See*—
Kajimura, Takashi; Saito, Kazutoshi; Shige, Noriyuki; Nakamura, Michiharu; Umeda, Jun-ichi; and Kobayashi, Masayoshi, 4,176,325, Cl. 331-94.50H.

Kobe Steel, Ltd.: *See*—
Mori, Kenji; Taniuchi, Mamoru; and Yaguchi, Shigeo, 4,176,041, Cl. 208-10.000.

Kobinger, Walter: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Koch Adler AG: *See*—
Scholl, Hans; and Tiemann, Helmut, 4,175,681, Cl. 223-2.000.

Koch, Kenneth F.: *See*—
Wessler, Louis E.; and Koch, Kenneth F., 4,176,379, Cl. 358-280.000.

Koch, Manfred; Handte, Reinhard; Horlein, Gerhard; Bieringer, Hermann; and Langeluddeke, Peter, to Hoechst Aktiengesellschaft. Phenoxy-phenoxypropionic acid esters. 4,175,947, Cl. 71-88.000.

Koel, Gerrit J.; and Postma, Lambertus, to U.S. Philips Corporation. Forming electrically insulating layers by sputter deposition. 4,176,016, Cl. 204-38.00R.

Koester, Earl J.: *See*—
DeVita, Alphonse J.; Koester, Earl J.; Manoogian, David V.; and Sharenson, Stanley, 4,176,351, Cl. 343-9.00R.

Koguchi, Nobuyuki; and Masumoto, Katashi, to National Research Institute for Metals. Photovoltaic converter. 4,176,370, Cl. 357-30.000.

Koide, Hideo: *See*—
Miyamoto, Kazuo; Suzuki, Isao; and Koide, Hideo, 4,175,373, Cl. 58-16.00D.

Kollmorgen Technologies Corporation: *See*—
Burr, Robert P.; Morino, Ronald; and Keogh, Raymond J., 4,175,816, Cl. 339-95.00R.

Kolobanov, Nikolai I.: *See*—
Onikov, Eduard A.; Galperin, Alexandr L.; Zabotin, Alexandr A.; Loschilin, Evgeny D.; and Kolobanov, Nikolai I., 4,175,594, Cl. 139-436.000.

Komatsu, Isamu; Sugawara, Toru; and Yamauchi, Tsukasa, to Hitachi, Ltd. Zero voltage switching solid state relay. 4,176,288, Cl. 307-252.00A.

Komatsu, Koei: *See*—
Makino, Kenya; Ishikawa, Tsunezo; and Komatsu, Koei, 4,176,219, Cl. 526-92.000.

Kommrusch, Richard S., to Motorola, Inc. Radio frequency lens. 4,176,322, Cl. 325-369.000.

Komori, Ryuichi: *See*—
Asano, Eijiro; and Komori, Ryuichi, 4,175,530, Cl. 123-140.0FG.

Kondo, Shoji: *See*—
Seino, Kuniki; Kondo, Shoji; Tanaka, Susumu; and Sugiyama, Takashi, 4,175,955, Cl. 430-35.000.

Kondoh, Syunichi: *See*—
Shinozaki, Fumiaki; Washigawa, Yasuo; Ikeda, Tomoaki; Nakao, Sho; and Kondoh, Syunichi, 4,175,971, Cl. 430-287.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kaneko, Yutaka; and Kawasaki, Mikio, 4,175,966, Cl. 430-438.000.
Kasahara, Tadashi, 4,176,363, Cl. 346-140.00R.
Kawada, Hiroh; Goto, Kiyoshi; and Kurita, Yoshio, 4,176,361, Cl. 346-1.100.

Konrad, William L., to United States of America, Navy. Propagation sampled acoustic line array. 4,176,339, Cl. 367-121.000.

Kontsov, Jury M.: *See*—
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.

Koppensteiner, Alfred H., to Hughes Aircraft Company. Optical transmission system with a pechan prism for equalizing optical paths. 4,175,825, Cl. 350-34.000.

Korn, Donald M.; and Nelson, Owen L., to Minnesota Mining and Manufacturing Company. Radiation imaging and readout system and method utilizing a multi-layered device having a photoconductive insulative layer. 4,176,275, Cl. 250-213.00R.

Korner, Otto; and Bardiani, Christian, to Diehl GmbH & Co. Endless tread of the single-pin type. 4,175,798, Cl. 305-58.00R.

Kosarek, Louis J.: *See*—
Wheatley, Robert T.; and Kosarek, Louis J., 4,176,057, Cl. 210-23.00H.

Koski, John A.; and Weaver, Richard B., to International Business Machines Corporation. Adaptive speed/interblock gap control for tape drive. 4,176,380, Cl. 360-50.000.

Koslow, George. Solid stress motor. 4,175,390, Cl. 60-527.000.

Koslowski, Gerhard: *See*—
Derichs, Josef; and Koslowski, Gerhard, 4,175,718, Cl. 242-150.00R.

Kottas, Rolf, to "Laser-Light" Gesellschaft mit beschrankter Haftung. System for the alignment of a laser beam transmitter with a sighting mechanism set up in another place. 4,175,861, Cl. 356-153.000.

Kottke, Joachim: *See*—
Muller, Erich; and Kottke, Joachim, 4,175,298, Cl. 7-138.000.

Kourimsky, Friedrich J. A.; and John, Heinrich, to AMP Incorporated. Electrical connectors. 4,175,818, Cl. 339-176.0MP.

Kovacs, Gabor: *See*—
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.

Kovatch, George N.; Rosey, Richard; and Simon, Ned H., to Westinghouse Electric Corp. Bus connector for welded electrical switchboard bus structure. 4,176,243, Cl. 174-72.00B.

Kraft, Kurt; and Walz, Gerd, to Hoechst Aktiengesellschaft. Highly reactive powder resin compositions containing polycarboxylic acid anhydrides. 4,176,143, Cl. 260-835.000.

Kraftwerk Union Aktiengesellschaft: *See*—
Exner, Gerhard; and Festinori, Volfango, 4,175,453, Cl. 81-57.380.

Kramer, Melvin G., to Brunton Company, The. Magnetic compass. 4,175,333, Cl. 33-344.000.

Kranich, Joel H.; Adam, Robert A.; and Culbertson, Charles L., to Kranich, Joel H. Modular constructional units for a combined storage bin and display assembly. 4,175,807, Cl. 312-118.000.

Kranz, Berthold, to Carl Canzler, Firma. Device for cooling a quenching bath of melted salt. 4,175,730, Cl. 266-120.000.

Krause, Donald. Multipart photosensitive element with independent contrast control of constituent part records. 4,175,967, Cl. 430-503.000.

Krautkremer, Franz, to Schottel-Werft Josef Becker GmbH & Co. KG. Tugboat or the like. 4,175,511, Cl. 115-35.000.

Kreb, Robert J., III. Scalable syringe. 4,175,559, Cl. 128-218.00R.

Krekeler, Claude B., to Cincinnati Mine Machinery Company, The. Ground engaging tread or track comprised of improved articulated crawler pads, for treaded vehicles such as mining machines and the like. 4,175,797, Cl. 305-53.000.

Kren, George J.: *See*—
Urbanek, Karel; Kren, George J.; and Wheeler, William R., 4,175,441, Cl. 73-599.000.

Krestmark Industries, Inc.: *See*—
Foss, Steven K., 4,175,737, Cl. 269-317.000.

Kretzschmar, Wolfgang: *See*—
Wilmes, Manfred; Finger, Torsten; Fitzler, Arno; Kretzschmar, Wolfgang; and Franke, Heinrich, 4,175,820, Cl. 339-198.00R.

Krider, Paul R.: *See*—
Coldren, Daniel R.; Krider, Paul R.; and Williams, Benjamin C., 4,175,811, Cl. 339-19.000.

Krivenko, Valery G.: *See*—
Kuchuk-Yatsenko, Sergei I.; Golomovzjuk, Ivan K.; Krivenko, Valery G.; Kulesh, Alexandr I.; Sakharnov, Vasily A.; Lazebny, Ivan L.; and Porkhun, Fedor K., 4,175,897, Cl. 409-300.000.

Kroger, Harry, to Sperry Rand Corporation. Josephson tunnel junction device with hydrogenated amorphous silicon, germanium or silicon-germanium alloy tunneling barrier. 4,176,365, Cl. 357-5.000.

Kroplinski, Thaddeus F.: *See*—
Brauer, Melvin; and Kroplinski, Thaddeus F., 4,176,239, Cl. 174-23.00C.

Kruegle, Herman, to Visual Methods, Inc. Access control system. 4,175,775, Cl. 283-7.000.

Krug, Herbert: *See*—
Platz, Rolf; Dockner, Toni; Heners, Jurgen; and Krug, Herbert, 4,176,137, Cl. 260-561.00N.

Krutak, James J.: *See*—
Haley, Neil F.; Krutak, James J.; and Ott, Robert J., 4,175,956, Cl. 430-37.000.

Kube, Wolfram H.; and Shuck, David L., to Wyoming Mineral Corporation. Solution mining utilizing dissolved oxygen with elimination of entrained gas. 4,175,789, Cl. 299-4.000.

Kubota, Kimi: *See*—
Kawamura, Hideo; Ohta, Hideo; and Kubota, Kimi, 4,175,522, Cl. 123-119.00A.

Kubota, Masayuki; and Hanano, Masamitu, to Hitachi, Ltd. Man conveyor. 4,175,653, Cl. 198-332.000.

Kuchuk-Yatsenko, Sergei I.; Golomovzjuk, Ivan K.; Krivenko, Valery G.; Kulesh, Alexandr I.; Sakharnov, Vasily A.; Lazebny, Ivan L.; and Porkhun, Fedor K. Apparatus for removing flash from resistance butt-weld joints in rails. 4,175,897, Cl. 409-300.000.

Kuettner, Klaus E., to Rush-Presbyterian-St. Luke's Medical Center. Inhibition of bone resorption. 4,176,177, Cl. 424-95.000.

Kugelfischer Georg Schafer & Co.: *See*—
Voll, Horst; Kessler, Franz; and Herla, Max, 4,175,802, Cl. 308-9.000.

Kuhn, Charles J. Safety tie down for a pulling apparatus. 4,175,420, Cl. 72-447.000.

Kuhn, Ralph F., Jr., to United States of America, Air Force. Floating head laser mirror assembly. 4,175,835, Cl. 350-310.000.

Kuhn S.A.: *See*—
Gerlinger, Frederic, 4,175,369, Cl. 56-370.000.

Kulesh, Alexandr I.: *See*—
Kuchuk-Yatsenko, Sergei I.; Golomovzjuk, Ivan K.; Krivenko, Valery G.; Kulesh, Alexandr I.; Sakharnov, Vasily A.; Lazebny, Ivan L.; and Porkhun, Fedor K., 4,175,897, Cl. 409-300.000.

Kulik, George J.; Meslink, Michael C.; and Mulder, James P., to Abex Corporation. Shock isolating lamp assembly. 4,176,391, Cl. 362-390.000.

Kumagai, Hiroji: *See*—
Naganuma, Tsutomu; Hoshi, Hisao; Kumagai, Hiroji; and Yoshida, Kaneki, 4,175,958, Cl. 430-49.000.

Kumagaya, Teruo, to Asahimatsu Koridofu Kabushiki Kaisha. Automatic high-pressure flash cooker. 4,175,482, Cl. 99-330.000.

Kume, Kazunari: *See*—
Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Ohno, Hideshi; and Natori, Minoru, 4,175,372, Cl. 58-5.000.

Kumode, Masami, to Tanaka, Kiyomitsu, a part interest. Openable canopy housing. 4,175,361, Cl. 52-66.000.

Kuraray Co., Ltd.: *See*—
Sakurada, Yutaka; Sunahara, Kimihisa; and Yamauchi, Kazuhisa, 4,176,070, Cl. 210-500.00M.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Kawabe, Naoshi; Kaji, Hisatsugu; Miwa, Naotaka; Nakanishi, Hajime; Tanaka, Fumiaki; and Inoue, Tatsuya, 4,175,708, Cl. 241-16.000.

Kurihara, Sohachi. Sphygmomanometer aid. 4,175,547, Cl. 128-680.000.

Kurita, Yoshio: *See*—
Kawada, Hiroh; Goto, Kiyoshi; and Kurita, Yoshio, 4,176,361, Cl. 346-1.100.

Kutsuna, Muneharu: *See*—
Terai, Kiyohide; and Kutsuna, Muneharu, 4,176,271, Cl. 219-121.0EM.

Kutter, Eberhard: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Kuwayama, Masatoshi: *See*—
Nakamura, Ichiro; Ichiryu, Ken; and Kuwayama, Masatoshi, 4,175,589, Cl. 137-625.640.

Kwak, In S. Nasal gastric tube insertion guide and method. 4,175,564, Cl. 128-350.00R.

KYC Machine Industry Co.: *See*—
Ozasa, Masahiro; Murayama, Kenya; and Okumura, Masako, 4,175,814, Cl. 241-46.00R.

Kyncl, John J.: *See*—
Winn, Martin; and Kyncl, John J., 4,176,191, Cl. 424-274.000.

Lafayette Pharmacal Inc.: *See*—
Newton, Barry N., 4,175,544, Cl. 128-654.000.

Lagerstrom, Gosta B., to Boliden Aktiebolag. Process and an apparatus for alkali-treatment of lignocellulosic material. 4,176,203, Cl. 426-636.000.

Lagos, Costas C.; Lanio, Ricardo A.; Crowley, John L.; and Moreau, Norman A., to GTE Sylvania Incorporated. Internal coating process for glass tubing. 4,175,941, Cl. 65-60.00B.

Laidler, John B.; and Abrahams, Roy H., to Radiochemical Centre Ltd., The. Process for concentrating technetium-99m. 4,176,158, Cl. 423-2.000.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Prost, Roger; and Manhes, Bernard, 4,175,395, Cl. 62-52.000.

Laker, Thomas L. Apparatus and method for collecting, storage and transporting liquid samples for diagnostic examination. 4,175,439, Cl. 73-425.40R.

Lampert, Albert J., to Cambria Spring Company. Vehicle suspension system having auxiliary spring for lightly loaded conditions. 4,175,772, Cl. 280-718.000.

Lane, Constance A.: *See*—
Leslie, John P.; Lane, Constance A.; and Grant, R. Peter, 4,176,101, Cl. 260-22.00T.

Lang, Arnold; and Hortig, Hans-Peter, to Hoechst Aktiengesellschaft. Clear air device. 4,175,934, Cl. 55-267.000.

Lang, John M., to Boeing Company, The. Track mounted cargo shuttle. 4,175,656, Cl. 198-748.000.

Lang, Pierre, to J. Bobst & Fils, S.A. Device for stripping blanks from a die cut sheet of blanks. 4,175,686, Cl. 225-97.000.

Langeluddeke, Peter: *See*—
Koch, Manfred; Handte, Reinhard; Horlein, Gerhard; Bieringer, Hermann; and Langeluddeke, Peter, 4,175,947, Cl. 71-88.000.

Lanio, Ricardo A.: *See*—
Lagos, Costas C.; Lanio, Ricardo A.; Crowley, John L.; and Moreau, Norman A., 4,175,941, Cl. 65-60.00B.

LaPorte, Gordon J. Photo-typewriter. 4,175,841, Cl. 354-5.000.

"Laser-Light" Gesellschaft mit beschrankter Haftung: *See*—
Kottas, Rolf, 4,175,861, Cl. 356-153.000.

Lashley, Ronald T., to Emmons Guitar Company, Inc. String mounting apparatus. 4,175,467, Cl. 84-312.00P.

Lassanske, George G. Direct current motor driven vehicle with hydraulically controlled variable speed transmission. 4,175,632, Cl. 180-65.00R.

Laud, Tynis A.: *See*—
Pungas, Toom A.; Laud, Tynis A.; Reinberg, Kheino A.; Rebane, Raul-Vello P.; and Lumi, Toomas R., 4,176,393, Cl. 363-125.000.

Laurent, Henry: *See*—
Annen, Klaus; Laurent, Henry; Hofmeister, Helmut; Wiechert, Rudolf; Wendt, Hans; and Kapp, Joachim-Friedrich, 4,176,126, Cl. 260-397.450.

Laurmann, Giselle V.: *See*—
Jeppson, Morris R., 4,175,885, Cl. 404-77.000.

Lawler, John A.: *See*—
Birch, Stanley F.; Lawler, John A.; and Paynter, Gerald C., 4,175,640, Cl. 181-213.000.

Layton, Charles T.: *See*—
Mortimer, Ivan; and Layton, Charles T., 4,175,795, Cl. 303-118.000.

Lazarre, Flavien: *See*—
Bimond, Jean-Pierre; and Lazarre, Flavien, 4,175,424, Cl. 73-49.200.

Lazebny, Ivan L.: *See*—
Kuchuk-Yatsenko, Sergei I.; Golomovzjuk, Ivan K.; Krivenko, Valery G.; Kulesh, Alexandr I.; Sakharnov, Vasily A.; Lazebny, Ivan L.; and Porkhun, Fedor K., 4,175,897, Cl. 409-300.000.

Leach, George S.; and O'Connell, Timothy R., to Electronic Memories & Magnetics Corporation. Driving circuit for integrated circuit semiconductor memory. 4,176,289, Cl. 307-270.000.

Leavy, William A.; and Griffin, Charles R., to United States of America, National Aeronautics and Space Administration. Antenna deployment mechanism for use with a spacecraft. 4,176,360, Cl. 343-883.000.

LeCarvennec, Francois: *See*—
Bricot, Claude; Dubois, Jean-Claude; LeCarvennec, Francois; Lehureau, Jean-Claude; and Magna, Henriette, 4,176,277, Cl. 250-316.100.

Ledergerber, Charles P.: *See*—
D'Haenens, Irnee J.; and Ledergerber, Charles P., 4,175,551, Cl. 128-24.400.

Lee, Ernest P., to Honeywell Information Systems, Inc. Read apparatus. 4,176,259, Cl. 235-449.000.

Leftin, Harry P.; and Newsome, David S., to Pullman Incorporated. Pyrolysis coke inhibition. 4,176,045, Cl. 208-48.00R.

Lehureau, Jean-Claude: *See*—
Bricot, Claude; Dubois, Jean-Claude; LeCarvennec, Francois; Lehureau, Jean-Claude; and Magna, Henriette, 4,176,277, Cl. 250-316.100.

Leichtman, Ahron P.: *See*—
Goldblatt, Samuel; and Scott, Waller M., Jr., 4,175,546, Cl. 128-739.000.

Leifeld, Ferdinand: *See*—
Vollrath, Ulrich; and Leifeld, Ferdinand, 4,175,893, Cl. 406-52.000.

Leininger, James R.; and Vrzalik, John H. Therapeutic bed. 4,175,550, Cl. 128-24.00R.

Leiter, Robert, to Webasto-Werk W. Baier GmbH & Co. Motor vehicle roof. 4,175,785, Cl. 296-137.00E.

Leitz, Ludwig; Heitmann, Knut; Schneider, Eckart; and Schmidt, Horst, to Ernst Leitz Wetzlar GmbH. Method and apparatus for measuring distances. 4,175,365, Cl. 356-4.000.

Lekas, Mitchell A.: *See*—
Britton, Keith C.; and Lekas, Mitchell A., 4,175,490, Cl. 102-23.000.

Lemelson, Jerome H. Composite structural members and fastening methods. 4,175,883, Cl. 403-347.000.

Lempa, Bernard J., Jr. Trim tab control mechanism. 4,175,721, Cl. 244-83.00F.

Lenk, Erich: *See*—
Schippers, Heinz; and Lenk, Erich, 4,175,712, Cl. 242-46.400.

Lenthe, Manfred; and Dankert, Gerhard, to Bayer Aktiengesellschaft. Process for isolating N,N-dimethylaminoacetonitrile from water mixtures. 4,176,133, Cl. 260-465.50R.

Les Jouets Educatifs Universels: *See*—
Hudson, Robert H., 4,175,747, Cl. 273-101.200.

Leshkowitz, Victor. Transmission trunk powering system. 4,176,320, Cl. 325-308.000.

Leslie, John P.; Lane, Constance A.; and Grant, R. Peter, to Rohm and Haas Company. Melt strength improvement of PET. 4,176,101, Cl. 260-22.00T.

LeStrange, Raymond J., to Du Pont de Nemours, E. I., and Company. Process for sensitizing photographic silver halide emulsions. 4,175,970, Cl. 430-529.000.

Letournoux, Alain; and Canals, Charles, to Societe Industrielle Bertrand Faure. Seathinge. 4,175,301, Cl. 16-146.000.

Lever Brothers Company: *See*—
Princen, Henricus M.; and Aronson, Michael P., 4,176,200, Cl. 426-250.000.

Levitt, George: *See*—
Goddard, Steven J.; and Levitt, George, 4,175,948, Cl. 71-96.000.

Levy, Jerome F.: *See*—
Lewis, Sheldon N.; and Levy, Jerome F., 4,176,232, Cl. 560-222.000.

Lewandowski, Joseph T.: *See*—
Horowitz, Harold S.; Longo, John M.; and Lewandowski, Joseph T., 4,176,094, Cl. 252-518.000.

Lewis, Robert B.; and Giversen, Terri A., to Western Electric Company, Inc. Powder coating composition. 4,176,142, Cl. 525-336.000.

Lewis, Sheldon N.; and Levy, Jerome F., to Rohm and Haas Company. Sulfonic acid salts of acyloxyalkylamines. 4,176,232, Cl. 560-222.000.

Lexalite International Corporation: *See*—
Barnes, Jocelyn T., 4,175,661, Cl. 206-519.000.

Licentia Patent-Verwaltungs-G.m.b.H.: *See*—
Metz, Hellmut; and Kage, Henning, 4,176,069, Cl. 210-321.00B.

Light, William A.: *See*—
Berwick, Martin A.; Fox, Charles J.; and Light, William A., 4,175,960, Cl. 430-58.000.

Lillie, Christian: *See*—
Austel, Volkhard; Kutter, Eberhard; Heider, Joachim; Eberlein, Wolfgang; Kobinger, Walter; Lillie, Christian; Diederen, Willi; and Haarmann, Walter, 4,176,184, Cl. 424-248.520.

Lilly Industries Limited: *See*—
Corfield, John R.; and Taylor, Clifford G., 4,176,231, Cl. 544-16.000.

Limburg, William R.: *See*—
Turner, William C.; Limburg, William R.; and Burton, John S., 4,175,855, Cl. 355-68.000.

Lin, Tz-Hong: *See*—
Winchell, Harry S.; Lin, Tz-Hong; and Panneciere, Charles A., 4,176,173, Cl. 424-5.000.

Linares, Robert C.; and Ambasz, Wiktor, to Allied Chemical Corporation. Preparation of phosphorus containing metallic glass forming alloy melts. 4,175,950, Cl. 75-53.000.

Lindholm, Carl E.: *See*—
Foster, L. Curtis; and Lindholm, Carl E., 4,176,356, Cl. 343-100.0CS.

Linn, John C.: *See*—
Dimyan, Magid Y.; Hubbell, Wayne C.; Chang, Christopher T. M.; and Linn, John C., 4,176,404, Cl. 365-12.000.

Linscott, Phillip S., Jr., to Sundstrand Corporation. Diode housing. 4,176,242, Cl. 174-52.00H.

Lipp, George D., to Corning Glass Works. Method of glass drawing. 4,175,942, Cl. 65-60.00B.

Lippera, Noel, to Pont-A-Mousson S.A. Method of coupling plastic pipes by welding and a connection piece for coupling same. 4,176,274, Cl. 219-522.000.

Liquid Crystal Products, Inc.: *See*—
Suzuki, Fred K.; and Davison, Thomas W., 4,175,543, Cl. 128-736.000.

Llewellyn, Link W., to Chi Rho Corporation. Eye-hand coordinator. 4,175,744, Cl. 273-26.00E.

Lockheed Corporation: *See*—
Wilhelm, William E., 4,175,754, Cl. 277-128.000.
Wirt, Leslie S., 4,175,639, Cl. 181-210.000.

Lodge, Maurice H., to Motorola, Inc. Vibratory feeder system and mechanism. 4,175,654, Cl. 198-398.000.

Loew, Peter; and Hummel, Wolfgang, to Hoechst Aktiengesellschaft. Electromechanical switching system. 4,175,448, Cl. 74-365.000.

Loewe, Heinz; Urbanietz, Josef; Duwel, Dieter; and Kirsch, Reinhard, to Hoechst Aktiengesellschaft. Substituted phenylguanidines and process for their manufacture. 4,176,192, Cl. 424-300.000.

Lohmus, Ivar: *See*—
Hahn, Thomas M.; Lohmus, Ivar; and Oakley, David E., 4,175,617, Cl. 165-122.000.

Lohr & Bromkamp GmbH: *See*—
Frauenhoffer, Josef; and Ruger, Gerd, 4,175,319, Cl. 29-724.000.

Lonberger, John W., to Owens-Corning Fiberglas Corporation. Digital communications system. 4,176,401, Cl. 364-900.000.

Longo, John M.: *See*—
Horowitz, Harold S.; Longo, John M.; and Lewandowski, Joseph T., 4,176,094, Cl. 252-518.000.

Loos, John H., to White Consolidated Industries, Inc. Self-alignment clip for aligning hubs to flat shafts. 4,175,881, Cl. 403-13.000.

Loschilin, Evgeny D.: *See*—
Onikov, Eduard A.; Galperin, Alexandr L.; Zabotin, Alexandr A.; Loschilin, Evgeny D.; and Kolobanov, Nikolai I., 4,175,594, Cl. 139-436.000.

Lough, Wendell J.; and Bishop, Donald E., to Weber Technical Products Division of Craig Systems Corp. Diffuser with replaceable filter. 4,175,936, Cl. 55-385.00A.

Loutfy, Rafik O.; McIntyre, Lloyd F.; and Sharp, James H., to Xerox Corporation. Photovoltaic cell comprising metal-free phthalocyanine. 4,175,981, Cl. 136-89.0SJ.

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Lower, Joseph D.: *See*—
Phaup, Charles W.; and Lower, Joseph D., 4,175,889, Cl. 405-195.000.

Lu, Chin H., to Xerox Corporation. Field dependent toner having chrome complex coated magnetic particles. 4,176,078, Cl. 430-109.000.

Lubrizol Corporation, The: *See*—
Ripple, David E., 4,176,077, Cl. 252-51.50R.
Surbey, Donald L.; Clark, Alan C.; and Miller, Leonard E., 4,176,081, Cl. 252-182.000.

Lucas Industries Limited: *See*—
Roberts, Thomas E. E., 4,175,472, Cl. 91-6.500.
Smith, Trevor S., 4,175,383, Cl. 60-39.28R.

Luckenbach, Edward C., to Exxon Research & Engineering Co. Process for regenerating metal-contaminated hydrocarbon conversion catalysts. 4,176,084, Cl. 252-417.000.

Lumi, Toomas R.: *See*—
Pungas, Toom A.; Laud, Tynis A.; Reinberg, Kheino A.; Rebane, Raul-Vello P.; and Lumi, Toomas R., 4,176,393, Cl. 363-125.000.

Lund, Ernest K., to Edgar Pickering (Blackburn) Ltd. Knife assembly for a tufting machine. 4,175,497, Cl. 112-79.00R.

Lunde, Jon. Heat recovery system. 4,175,403, Cl. 62-324.000.

Luptovits, Roland: *See*—
Zauhar, Helmut; Authier, Bernhard; Luptovits, Roland; and Schmidhammer, Leonhard, 4,175,610, Cl. 164-60.000.

Lussier, Roger J.: *See*—
Vaughan, David E. W.; Lussier, Roger J.; and Magee, John S., Jr., 4,176,090, Cl. 252-455.00Z.

Luwa AG: *See*—
Gasser, Hermann; and Curiger, Karl, 4,175,371, Cl. 57-304.000.

Lynes, Inc.: *See*—
Coone, Malcolm G., 4,175,592, Cl. 138-89.000.

Mabery, Thomas L., to Combustion Engineering, Inc. No-size squeezing of 180 degree boiler-tube return bends. 4,175,419, Cl. 72-383.000.

MacAndrews and Forbes Company: *See*—
Cook, Marvin K., 4,176,201, Cl. 426-548.000.
Hartung, Harold A., 4,176,228, Cl. 536-4.000.

Mackey, E. Scudder, to GAF Corporation. Antistatic photographic X-ray film having a uniform protective surface coating of surfactant oligomer of tetrafluoroethylene. 4,175,969, Cl. 430-539.000.

MacWilliams, Dalton C.; and Wirt, James R., to Dow Chemical Company, The. Aqueous suspensions. 4,175,975, Cl. 106-100.000.

Maeda, Keijiro: *See*—
Inanaga, Kiyofumi; Egawa, Saburo; Shimizu, Akio; and Maeda, Keijiro, 4,176,249, Cl. 179-1.00E.

Maekawa, Hideyuki; Noda, Kinzaburo; and Hoshi, Noboru, to Shionogi & Co., Ltd.; and Shin-Etsu Chemical Co., Ltd. Sugar-coated solid dosage forms. 4,176,175, Cl. 424-35.000.

Magder, Jules; and Reich, Murray H., to Princeton Chemical Research, Inc. Method of manufacturing microporous paper-like butene-1 polymer sheets. 4,176,148, Cl. 264-41.000.

Magee, John S., Jr.: *See*—
Vaughan, David E. W.; Lussier, Roger J.; and Magee, John S., Jr., 4,176,090, Cl. 252-455.00Z.

Magna, Henriette: *See*—
Bricot, Claude; Dubois, Jean-Claude; LeCarvennec, Francois; Lehureau, Jean-Claude; and Magna, Henriette, 4,176,277, Cl. 250-316.100.

Maisonneuve, Leo V. Container and dispensing package. 4,175,675, Cl. 221-72.000.

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Makino, Kenya: *See*—
Ikeda, Hiroharu; Matsumoto, Shuichi; and Makino, Kenya, 4,176,220, Cl. 526-97.000.

Makino Milling Machine Co., Ltd.: *See*—
Kishinami, Tateshi; and Sato, Makoto, 4,175,896, Cl. 408-230.000.

Makino, Takenori: *See*—
Shimada, Shinichi; and Makino, Takenori, 4,175,505, Cl. 123-90.300.

Mallinckrodt, Inc.: *See*—
Sathe, Sharad S., 4,176,138, Cl. 260-575.000.

Manfreda, Alfred, to Siemens Aktiengesellschaft. Circuit arrangement for determining the frequency dependent amplitude fluctuation characteristic of a communications transmission link. 4,176,317, Cl. 325-62.000.

Manhes, Bernard: *See*—
Prost, Roger; and Manhes, Bernard, 4,175,395, Cl. 62-52.000.

Manning, Walter; and Bradley, Terry G., to Ford Motor Company. Tilt cab steering column. 4,175,449, Cl. 74-492.000.

Manoogian, David V.: *See*—
DeVita, Alphonse J.; Koester, Earl J.; Manoogian, David V.; and Sharenson, Stanley, 4,176,351, Cl. 343-9.00R.

Mantey, Raymond N.: *See*—
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Marathon Oil Company: *See*—
Bruce, Charles R.; Johnson, Irvin D.; and McGrievy, Lawrence H., 4,176,052, Cl. 208-131.000.

Marconi Company Limited, The: *See*—
Tyler, Ronald A., 4,176,352, Cl. 343-9.00R.
Wood, Peter J., 4,176,358, Cl. 343-782.000.

Mares, Fred R.: *See*—
Colglazier, Donald F.; Fallon, John L.; Kimble, George P.; and Mares, Fred R., 4,175,741, Cl. 271-3.100.

Marie, Georges R. P. Wave mode converter. 4,175,830, Cl. 350-157.000.

Marks, Alvin M.; and Marks, Mortimer. 3-Dimensional camera device. 4,175,829, Cl. 350-132.000.

Marks, Mortimer: *See*—
Marks, Alvin M.; and Marks, Mortimer, 4,175,829, Cl. 350-132.000.

Markusch, Peter: *See*—
Petinaux, Marcel; Dieterich, Dieter; and Markusch, Peter, 4,176,118, Cl. 260-239.00A.

Marquet, William M.: *See—*
Spindel, Robert C.; Porter, Robert P.; and Marquet, William M., 4,176,338, Cl. 367-6.00E.

Marr, Peter: *See—*
von Klinggraff, Gerhard; Marr, Peter; and Bohnes, Karlheinz, 4,175,891, Cl. 405-291.000.

Mars, William T.: *See—*
Genis, James; and Mars, William T., 4,175,455, Cl. 83-110.000.

Marshall, Thomas B. Combination luggage carrier and cart. 4,175,761, Cl. 280-47.180.

Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, to Abbott Laboratories. 2-Deoxy-2'-N-acyl and alkyl fortimicins A and B. 4,176,178, Cl. 424-180.000.

Martin Marietta Corporation: *See—*
Fales, David, III, 4,176,357, Cl. 343-112.00R.

Martin, Robert J.: *See—*
Unruh, Dennis R.; and Martin, Robert J., 4,175,914, Cl. 417-218.000.

Martin, Sylvia, to Oxy Metal Industries Corporation. Brightening composition for acid zinc electroplating bath and process. 4,176,017, Cl. 204-55.00R.

Marzocchi, Alfred; Roberts, Michael G.; and Bolen, Charles E., to Owens-Corning Fiberglas Corporation. Road pavement and repair. 4,175,978, Cl. 106-281.00R.

Masaki, Katsumi: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,175,851, Cl. 355-14.00R.

Maschinenbau Oppenweiler GmbH: *See—*
Klenk, Emil, 4,175,740, Cl. 270-83.000.

Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See—*
Kleim, Karl-Heinz, 4,175,495, Cl. 105-450.000.

Mashimo, Yukio: *See—*
Iwashita, Tomonori; Takimoto, Hiroyuki; Mashimo, Yukio; and Hashimoto, Teiji, 4,175,845, Cl. 354-173.000.

Maso-Therm Corp.: *See—*
Piazza, Matthew R., 4,175,867, Cl. 366-9.000.

Massachusetts Institute of Technology: *See—*
Moskowitz, Jacob F., 4,176,329, Cl. 333-28.00T.
Suh, Nam P.; Rotz, Christopher A.; and Erwin, Lewis, II, 4,175,871, Cl. 366-79.000.

Masuda, Michio: *See—*
Inoue, Fumio; and Masuda, Michio, 4,176,302, Cl. 315-397.000.

Masukawa, Toyoaki: *See—*
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Masumoto, Katashi: *See—*
Koguchi, Nobuyuki; and Masumoto, Katashi, 4,176,370, Cl. 357-30.000.

Mathews, Margaret R. Needlework stand. 4,175,343, Cl. 38-102.100.

Mathiolon, Henri; and Charbonnier, Simon. Overhead creel for twisting machines. 4,175,717, Cl. 242-131.000.

Matkan, Josef, to Moore Business Forms, Inc. Information recording and recognition. 4,176,406, Cl. 365-148.000.

Matsumoto, Michiaki; Honda, Juichi; and Mimori, Sadao, to Hitachi, Ltd. Gas burner. 4,175,919, Cl. 431-114.000.

Matsumoto, Nobuo: *See—*
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, 4,176,091, Cl. 252-456.000.

Matsumoto, Shuichi: *See—*
Ikeda, Hiroharu; Matsumoto, Shuichi; and Makino, Kenya, 4,176,220, Cl. 526-97.000.

Matsumoto, Sojiro: *See—*
Ide, Akira; and Matsumoto, Sojiro, 4,176,132, Cl. 260-453.00A.

Matsumoto, Yasushi: *See—*
Toda, Minoru; Osaka, Susumu; and Matsumoto, Yasushi, 4,176,378, Cl. 358-128.000.

Matsuo, Syunji: *See—*
Fujiwhara, Mitsuto; Matsuo, Syunji; Masukawa, Toyoaki; Kaneko, Yutaka; and Kawasaki, Mikio, 4,175,966, Cl. 430-438.000.

Matsushima Kogyo Kabushiki Kaisha: *See—*
Negita, Mutsumi, 4,176,030, Cl. 204-192.00R.

Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawana, Yoshiyuki, to Sony Corporation. Semiconductor device having oxygen doped polycrystalline passivation layer. 4,176,372, Cl. 357-52.000.

Matsuura, Mitsuaki; Hidano, Tsuyoshi; and Suzuki, Masahiro, to Doryokuro Kakunenryo Kaihatsu Kigyodan. Apparatus of assembling fuel rod bundle. 4,175,318, Cl. 29-723.000.

Matsuura, Ryo; Nakatani, Shuichi; Nomiyama, Yukio; and Ninomiya, Tadashi, to Kawasaki Kasei Chemicals Ltd. Process for producing 1,4-dihydroanthraquinone. 4,176,125, Cl. 260-369.000.

Mayer, William N.: *See—*
Kirchner, Richard K.; Mayer, William N.; and Andreadakis, Nicholas C., 4,176,298, Cl. 315-169.200.

McCarty, Jimmie G. Energy saving furnace construction. 4,175,538, Cl. 126-85.00B.

McCombie, Jay C.: *See—*
Chadwick, Alexander; Khair, Magdi K.; and McCombie, Jay C., 4,175,587, Cl. 137-625.650.

McConaghy, James R., Jr., to Conoco, Inc. Process for utilizing petroleum residuum. 4,176,046, Cl. 208-50.000.

McCool, John B., III: *See—*
Patterson, George; Putman, Edgar N.; and McCool, John B., III, 4,176,096, Cl. 260-15.000.

McDonald, David M.: *See—*
Scheier, Donald J.; Crawford, David R.; and McDonald, David M., 4,175,302, Cl. 17-11.10R.

McDonald, James A.; and Novak, Mark C., to Union Carbide Corporation. Dispensing carton for corrugated plastic bags. 4,175,673, Cl. 221-63.000.

McDonough, Thomas B.: *See—*
Harvey, William J.; McDonough, Thomas B.; and Shaffer, John W., 4,176,389, Cl. 362-5.000.

McFeeters, Melvin M.: *See—*
Orrell, Derrell D.; and McFeeters, Melvin M., 4,176,047, Cl. 208-51.000.

McGlew, John J.; and McGlew, John J., Jr. Paint roller construction. 4,175,300, Cl. 15-103.500.

McGlew, John J., Jr.: *See—*
McGlew, John J.; and McGlew, John J., Jr., 4,175,300, Cl. 15-103.500.

McGovern, Stephen J.; Schatz, Klaus W.; and Zrinscak, Sr. Fred S., to Mobil Oil Corporation. Separating flue gas from regenerated cracking catalyst. 4,176,083, Cl. 252-411.00R.

McGraw-Edison Company: *See—*
Clark, Robert H., 4,175,483, Cl. 99-354.000.

McGrievy, Lawrence H.: *See—*
Bruce, Charles R.; Johnson, Irvin D.; and McGrievy, Lawrence H., 4,176,052, Cl. 208-131.000.

McGuire, C. James, to Fireplace Energy Inc. Fireplace heater and home pressurization system. 4,175,539, Cl. 126-121.000.

McIntyre, Lloyd F.: *See—*
Loutfy, Rafik O.; McIntyre, Lloyd F.; and Sharp, James H., 4,175,981, Cl. 136-89.0SJ.

McIntyre, Lorraine E. Restraining bar with alarm. 4,176,347, Cl. 340-545.000.

McLaren, Richard H. Water powered generator. 4,176,283, Cl. 290-52.000.

McMahon, Donald H., to Sperry Rand Corporation. Electro-optical multiplexer having multiple frequency resonant excitation. 4,175,827, Cl. 350-96.140.

McManus, Raymond. Refrigeration system. 4,175,401, Cl. 62-180.000.

McMillen, James W.; and Tomeo, Anthony, to Westinghouse Electric Corp. Automatic fail-safe mechanism-operated cell switch for metal-clad switchgear. 4,176,262, Cl. 200-50.0AA.

McNeil Corporation: *See—*
Genis, James; and Mars, William T., 4,175,455, Cl. 83-110.000.

McPhail, John D. Felt, belt, and fabric trimmer. 4,175,460, Cl. 83-856.000.

McRitchie, Charles A. Game apparatus with fence-like boundary defining members. 4,175,746, Cl. 273-85.00R.

Meadows, John W., to Quantor Corporation. Film duplicator. 4,175,858, Cl. 355-99.000.

Medi-Physics, Inc.: *See—*
Winchell, Harry S.; Lin, Tz-Hong; and Panneciere, Charles A., 4,176,173, Cl. 424-5.000.

Meier, Werner: *See—*
Wesenmeyer, Jurgen; Haubner, Georg; and Meier, Werner, 4,175,508, Cl. 123-117.00R.

Meikis, Gunter: *See—*
Wenzl, Josef; and Meikis, Gunter, 4,175,438, Cl. 73-359.00R.

Meisenhelder, William C.: *See—*
Alsberg, Henry; Skalla, Dale; and Meisenhelder, William C., 4,176,104, Cl. 260-28.50R.

Meisinger, Robert H., to Rohm and Haas Company. Benzophenones and benzhydrols. 4,175,945, Cl. 71-78.000.

Mel Modern Systems, Incorporated: *See—*
Roantree, William J.; and Bartini, Paul S., 4,175,540, Cl. 126-425.000.

Melvin, Lawrence S., Jr., to Pfizer Inc. Hypoglycemic arylcyclohexane acetic acids. 4,176,196, Cl. 424-308.000.

Mennesson, Andre L., to Societe Industrielle de Brevets et d'Etudes S.I.B.E. Fuel supply device for internal combustion engine. 4,175,528, Cl. 123-139.0AW.

Mentesana, John P. Tamper-proof adaptor for an electric meter. 4,175,813, Cl. 339-36.000.

Merck & Co., Inc.: *See—*
Baldwin, John J.; and Ponticello, Gerald S., 4,176,183, Cl. 424-248.520.
Ruyle, William V.; and Fisher, Michael H., 4,176,187, Cl. 424-263.000.

Merker, Walter H., Jr.: *See—*
Dillner, Arthur M.; and Merker, Walter H., Jr., 4,175,667, Cl. 213-40.00R.

Merlack, William A.; and Royston, John H., to Royston Laboratories, Inc. Wire splice insulators. 4,176,245, Cl. 174-92.000.

Merrick, George J.; Cook, George E.; and Modglin, Donald D., to Merrick Welding International, Inc. Clamping apparatus for welding circumferential articles. 4,176,269, Cl. 219-60.00A.

Merrick Welding International, Inc.: *See—*
Merrick, George J.; Cook, George E.; and Modglin, Donald D., 4,176,269, Cl. 219-60.00A.

Merz, Herbert: *See—*
Goldberg, Leon I.; Merz, Herbert; and Stockhaus, Klaus, 4,176,186, Cl. 424-260.000.

Meslink, Michael C.: *See—*
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Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See—*
Thomanek, Franz R., 4,175,491, Cl. 102-56.0SC.
Messina, Gene. Electronic game. 4,175,743, Cl. 273-1.00E.
Metz, Hellmut; and Kage, Henning, to Licentia Patent-Verwaltungs-G.m.b.H. Device for exchanging substances and method of manufacturing the device. 4,176,069, Cl. 210-321.00B.
Meyer, Gustave C., III. Hand-held wedge tool for splitting wood. 4,175,601, Cl. 145-1.00R.
Meyer, Roth & Pastor Maschinenfabrik GmbH: *See—*
Ditges, Gunter; Mors, Wilhelm; and Gartner, Rolf, 4,175,459, Cl. 83-315.000.
Micheron, Francois; and Bruneel, Jean-Luc, to Thomson-CSF. Reflecting electrostatic display cell. 4,176,345, Cl. 340-373.000.
Midgley, Calvert H. Solar heating system. 4,175,541, Cl. 126-429.000.
Midland-Ross Corporation: *See—*
Gute, Robert M., 4,175,588, Cl. 137-625.400.
Miedaner, Patrick M., to Certain-Teed Corporation. High temperature mineral fiber binder. 4,176,105, Cl. 260-29.300.
Mikami, Yasuo, to Nippon Oil Seal Industry Co., Ltd. Method of measuring directional properties of surface of shafts. 4,175,332, Cl. 33-174.00R.
Miki, Kyosuke; and Takeuchi, Masahiro, to Sumitomo Bakelite Company Limited. Method for thermoforming plastic sheets. 4,176,154, Cl. 264-547.000.
Milam, Ronald L.: *See—*
Yoo, Jin S.; and Milam, Ronald L., 4,176,085, Cl. 252-428.000.
Milbreath, Herman C.; and Williams, Alverson B., to General Motors Corporation. Radiator cooling system. 4,175,388, Cl. 60-337.000.
Millar, Huntly D., to Millar Instruments, Inc. Catheter fluid-velocity flow probe. 4,175,566, Cl. 128-692.000.
Millar Instruments, Inc.: *See—*
Millar, Huntly D., 4,175,566, Cl. 128-692.000.
Miller, Arthur F.: *See—*
Grasselli, Robert K.; Miller, Arthur F.; and Hardman, Harley F., 4,176,234, Cl. 562-546.000.
Miller, Donald L., to Facet Enterprises, Inc. Self-adjusting electromagnetic disc clutch. 4,175,650, Cl. 192-84.00C.
Miller, Franz-Friedrich: *See—*
Eckert, Guenter; Knaflic, France; Miller, Franz-Friedrich; and Zissel, Alfred, 4,175,922, Cl. 8-94.160.
Miller, Keith A.; and Osmundson, Eric C., to Air Products and Chemicals, Inc. Cryogenic embrittlement freezer with gas lock. 4,175,396, Cl. 62-63.000.
Miller, Larry D., to General Motors Corporation. Passive seat belt system. 4,175,773, Cl. 280-803.000.
Miller, Leonard E.: *See—*
Surbey, Donald L.; Clark, Alan C.; and Miller, Leonard E., 4,176,081, Cl. 252-182.000.
Mimori, Sadao: *See—*
Matsumoto, Michiaki; Honda, Juichi; and Mimori, Sadao, 4,175,919, Cl. 431-114.000.
Mine Ventilation Systems, Inc.: *See—*
Burgess, James V., Jr., 4,175,481, Cl. 98-50.000.
Minemet Recherche: *See—*
Predali, Jean-Jacques, 4,175,790, Cl. 299-7.000.
Miner Enterprises, Inc.: *See—*
Dillner, Arthur M.; and Merker, Walter H., Jr., 4,175,667, Cl. 213-40.00R.
Minin, Leonid K.: *See—*
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Minnesota Mining and Manufacturing Company: *See—*
Korn, Donald M.; and Nelson, Owen L., 4,176,275, Cl. 250-213.00R.
Niles, Gerald J., 4,175,685, Cl. 225-19.000.
Minolta Camera Kabushiki Kaisha: *See—*
Seino, Kuniki; Kondo, Shoji; Tanaka, Susumu; and Sugiyama, Takashi, 4,175,955, Cl. 430-35.000.
Minowa, Masahiro, to Kabushiki Kaisha Suwa Seikosha. Printer. 4,175,488, Cl. 101-99.000.
Misumi, Teruyuki; Furuhashi, Susumu; and Shiga, Masaaki, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for electrolytic dimerization of N-substituted pyridinium salt. 4,176,020, Cl. 204-72.000.
Mitchell, Sharon J.: *See—*
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Mitchell, Thomas O.; and Whitehurst, Darrell D., to Mobil Oil Corporation. Oxidation over synthetic amorphous silicas. 4,176,161, Cl. 423-213.500.
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Cella, James A.; and Mitchell, Tyrone D., 4,176,112, Cl. 260-37.0SB.
Mitsubishi Denki Kabushiki Kaisha: *See—*
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Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Yamanaka, Akira, 4,175,634, Cl. 180-274.000.
Mitsubishi Paper Mills, Ltd.: *See—*
Yoshida, Akio; Tsubai, Yasuo; and Ebato, Seigo, 4,175,965, Cl. 430-230.000.
Mittleman, Herbert: *See—*
Hess, John M., III; and Mittleman, Herbert, 4,175,558, Cl. 128-214.00C.
Miura, Motohisa, to Nippondenso Co., Ltd. Secondary air supply system for an internal combustion engine. 4,175,387, Cl. 60-290.000.
Miwa, Naotaka: *See—*
Kawabe, Naoshi; Kaji, Hisatsugu; Miwa, Naotaka; Nakanishi, Hajime; Tanaka, Fumiaki; and Inoue, Tatsuya, 4,175,708, Cl. 241-16.000.
Miyamoto, Kazuo; Suzuki, Isao; and Koide, Hideo, to Rhythm Watch Company Limited. Digital clock. 4,175,373, Cl. 58-16.00D.
Miyazaki, Michio, to Hitachi, Ltd. Information transfer apparatus. 4,176,341, Cl. 340-147.0LP.
Mlynar, Jiri: *See—*
Sevcik, Ladislav; Dvorak, Josef; and Mlynar, Jiri, 4,175,474, Cl. 92-13.500.
Mobil Oil Corporation: *See—*
Chen, Nai Y.; Garwood, William E.; and Peters, Alan W., 4,176,050, Cl. 208-111.000.
Johnson, George C., 4,175,944, Cl. 71-39.000.
McGovern, Stephen J.; Schatz, Klaus W.; and Zrinscak, Sr. Fred S., 4,176,083, Cl. 252-411.00R.
Mitchell, Thomas O.; and Whitehurst, Darrell D., 4,176,161, Cl. 423-213.500.
Schwab, Frederick C., 4,176,144, Cl. 525-91.000.
Mobus, Dietmar; Ehrenberger, Gunter; and Jobst, Wolfgang, to General Motors Corporation. Illuminated electric switches. 4,176,265, Cl. 200-316.000.
Modern Controls, Inc.: *See—*
Kirchner, Richard K.; Mayer, William N.; and Andreadakis, Nicholas C., 4,176,298, Cl. 315-169.200.
Modglin, Donald D.: *See—*
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Modine Manufacturing Company: *See—*
Huggins, Homer D., 4,175,614, Cl. 165-95.000.
Moebus, Horst, to Karl Schmidt GmbH. Liquid-cooled, assembled piston for internal combustion engines. 4,175,502, Cl. 123-41.350.
Moeglich, Karl, to Westinghouse Electric Corp. Water purification method and apparatus. 4,176,038, Cl. 204-277.000.
Moench, Frank F.; and Moench, Lawrence R. Asphalt cutting apparatus. 4,175,886, Cl. 404-90.000.
Moench, Lawrence R.: *See—*
Moench, Frank F.; and Moench, Lawrence R., 4,175,886, Cl. 404-90.000.
Moertel, George B., to Textron Inc. Apparatus and method of manufacture of trains of slide fastening elements. 4,176,149, Cl. 264-146.000.
Moir, David, to Alford Industries, Inc. Plasticized polyvinyl chloride blanks and cartons. 4,176,147, Cl. 264-25.000.
Moldavanov, Viktor P.: *See—*
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.
Molina, Orlando G., to Rockwell International Corporation. Fingerprint powder and method of application. 4,176,205, Cl. 427-1.000.
Molinari, Pietro. Toothbrush. 4,175,879, Cl. 401-287.000.
Molitorisz, Joseph. Bale forming apparatus. 4,175,487, Cl. 100-8.000.
Molnar, Charles J.; Price, Edward H.; and Resnick, Paul R., to Du Pont de Nemours, E. I., and Company. Ion-exchange structures of copolymer blends useful in electrolytic cells. 4,176,215, Cl. 521-27.000.
Money, Dudley P.: *See—*
Pratt, Harry H.; and Money, Dudley P., 4,175,519, Cl. 122-510.000.
Monks, Harry, to Coal Industry (Patents) Limited. Conveyor drives. 4,175,649, Cl. 192-18.00A.
Monsanto Company: *See—*
Baggett, William M.; and Plischke, LeMoyne W., 4,176,227, Cl. 528-488.000.
Bromley, James E.; and Yu, Jing-Peir, 4,176,150, Cl. 264-168.000.
Franz, John E.; and Kaufman, Robert J., 4,175,946, Cl. 71-87.000.
Montalvo, Edwin J., Sr. Air/mercury actuation of brakes and clutches. 4,175,651, Cl. 192-85.0AB.
Moore Business Forms, Inc.: *See—*
Matkan, Josef, 4,176,406, Cl. 365-148.000.
Moore, Charles F. Portable remote control signal. 4,176,343, Cl. 340-286.00R.
Moravec, Thomas J.; and Skogman, Richard A., to Honeywell Inc. Non-birefringent thallium iodide thin films for surface protection of halide optical elements. 4,176,207, Cl. 427-160.000.
Moravec, Thomas J.; and Skogman, Richard A., to Honeywell Inc. Production of inhomogeneous films by sequential layers of homogeneous films. 4,176,208, Cl. 427-160.000.
Moreau, Norman A.: *See—*
Lagos, Costas C.; Lanio, Ricardo A.; Crowley, John L.; and Moreau, Norman A., 4,175,941, Cl. 65-60.00B.
Morey, Everett D., to General Electric Company. Clothes washing machine. 4,175,409, Cl. 68-4.000.
Mori, Kenji; Taniuchi, Mamoru; and Yaguchi, Shigeo, to Kobe Steel, Ltd. Method for reforming low grade coals. 4,176,041, Cl. 208-10.000.
Morimoto, Yoshiro, to Nissan Motor Co., Ltd. Tandem master cylinder assembly. 4,175,392, Cl. 60-561.000.
Morino, Ronald: *See—*
Burr, Robert P.; Morino, Ronald; and Keogh, Raymond J., 4,175,816, Cl. 339-95.00R.
Morishita, Toshio: *See—*
Asanuma, Akira; Taneda, Nobuo; Hasegawa, Ryozo; Jindai, Shohei; and Morishita, Toshio, 4,176,156, Cl. 422-25.000.
Morrison, Russell F. Sink mounting means. 4,175,292, Cl. 4-187.00A.

Morrison, William R. B.; and Beale, Richard F., to Utah Development Company. Load measuring apparatus. 4,175,430, Cl. 73-141.00A.

Mors, Wilhelm: *See—*
Ditges, Gunter; Mors, Wilhelm; and Gartner, Rolf, 4,175,459, Cl. 83-315.000.

Mortimer, Bradford T.: *See—*
Fox, Roy A.; and Mortimer, Bradford T., 4,176,097, Cl. 260-17.4BB.

Mortimer, Ivan; and Layton, Charles T., to Girling Limited. Fluid-pressure operated anti-skid braking system for vehicles. 4,175,795, Cl. 303-118.000.

Mortimore, William M. Subsurface cutting tool for a tractor ripper shank. 4,175,341, Cl. 37-2.00R.

Morton, Richard G.: *See—*
Aldag, Henry R.; Morton, Richard G.; and Woodroffe, Jaime A., 4,176,324, Cl. 331-94.50T.

Moser, Billy G.; and Suter, Otto (Bo), Jr. Disposable dental amalgam capsule. 4,175,658, Cl. 206-221.000.

Moser, Henry T. Closure assembly. 4,175,672, Cl. 220-334.000.

Moser, Peter, to Schweizerische Lokomotiv-und Maschinenfabrik. Fluid pressure actuator interconnected bogies. 4,175,494, Cl. 105-176.000.

Moskowitz, Benson. Footers for supporting monuments for cemeteries and the like. 4,175,363, Cl. 52-294.000.

Moskowitz, Jacob F., to Massachusetts Institute of Technology. Tone control circuit. 4,176,329, Cl. 333-28.00T.

Motoren- und Turbinen-Union Friedrichafen GmbH: *See—*
Geafer, Salahaddin; and Zbikowski, Gerhard, 4,175,529, Cl. 123-140.00R.

Motoren- und Turbinen-Union Munchen GmbH: *See—*
Wenzl, Josef; and Meikis, Gunter, 4,175,438, Cl. 73-359.00R.

Motorola, Inc.: *See—*
Bachert, Peter, 4,176,332, Cl. 333-218.000.
Brown, Kenneth H.; and Shepard, John W., 4,176,328, Cl. 332-16.00T.
Foster, L. Curtis; and Lindholm, Carl E., 4,176,356, Cl. 343-100.0CS.
Horn, Paul H., 4,176,321, Cl. 325-325.000.
Johnson, James A.; and Kerfoot, Paul E., 4,176,318, Cl. 325-133.000.
Kommrusch, Richard S., 4,176,322, Cl. 325-369.000.
Lodge, Maurice H., 4,175,654, Cl. 198-398.000.
Remedi, James J., 4,176,287, Cl. 307-251.000.

Mougin, Georges L., to ITI Limited. Anti-swell protective device. 4,175,887, Cl. 405-25.000.

Mueller, William H.: *See—*
Hsiung, Du Y.; and Mueller, William H., 4,175,572, Cl. 132-7.000.

Mukachevsky Stankostroitelny Zavod Imeni S.M. Kirova: *See—*
Idel, Vladimir V., 4,175,452, Cl. 76-25.00R.

Mukumoto, Takaji: *See—*
Kasai, Kaname; Mukumoto, Takaji; Asakura, Toshikazu; and Ueda, Ryoji, 4,175,408, Cl. 64-26.000.

Mulder, James P.: *See—*
Kulik, George J.; Meslink, Michael C.; and Mulder, James P., 4,176,391, Cl. 362-390.000.

Muller, Erich; and Kottke, Joachim, to Stihl, Andreas. Handle for free-cutting devices. 4,175,298, Cl. 7-138.000.

Muller, Hermann, to Aktiengesellschaft Cilander. Apparatus for the application of individual pattern elements in series to a web-like flat structure. 4,175,997, Cl. 156-362.000.

Muller, Jean-Claude; and Ramuz, Henri, to Hoffmann-La Roche Inc. 2,4-Pyrimidine-dicarbamate-3-oxides. 4,176,119, Cl. 260-243.300.

Muller, Ortwin; Grunvogel, Karl; and Schulz, Kurt, to Carl Zeiss-Stiftung. Slit-lamp apparatus. 4,175,839, Cl. 351-14.000.

Muller, Wilhelm, to Postalia GmbH. Device for interlocking perforated writing material. 4,175,880, Cl. 402-48.000.

Multilift Oy: *See—*
Airaksinen, Markku, 4,175,904, Cl. 414-421.000.

Mulvey, Gerard E. Coffered ceiling system. 4,175,360, Cl. 52-28.000.

Murakami, Hiroyashu; Ito, Tadashi; Ito, Fumio; Sakurada, Nobuaki; Kawamura, Masaharu; and Shinoda, Nobuhiko, to Canon Kabushiki Kaisha. Photographic information displaying apparatus for a camera. 4,175,848, Cl. 354-289.000.

Murakami, Hiroyashu: *See—*
Sakurada, Nobuaki; Ito, Tadashi; Shinoda, Nobuhiko; Ito, Fumio; Murakami, Hiroyashu; and Kawamura, Masaharu, 4,175,842, Cl. 354-23.00D.

Murayama, Kenya: *See—*
Ozasa, Masahiro; Murayama, Kenya; and Okumura, Masako, 4,175,814, Cl. 241-46.00R.

Murphy, George W., to Dura Corporation. Parallel hitch for a belly mounted tractor appliance. 4,175,765, Cl. 280-460.00A.

Muscanell, Douglas W.: *See—*
Paris, Alfonso A., Jr.; and Muscanell, Douglas W., 4,175,458, Cl. 83-268.000.

Muskat, Kurt (Ulrich), to Klippan GmbH Sicherheitsgerate. Double shoulder lap safety belt. 4,175,787, Cl. 297-484.000.

Muzechuk, Richard A.; and Hyma, Marvin J., to General Motors Corporation. Resilient mounting means for MacPherson strut. 4,175,771, Cl. 280-696.000.

Mysels, Karol J., to General Atomic Company. Method of extracting iodine from liquid mixtures of iodine, water and hydrogen iodide. 4,176,169, Cl. 423-501.000.

N L Industries, Inc.: *See—*
Brauer, Melvin; and Kroplinski, Thaddeus F., 4,176,239, Cl. 174-23.00C.

Naf, Ferdinand; and Decorzant, Rene, to Firmenich SA. Process for preparing unsaturated spiranic derivatives. 4,176,139, Cl. 260-586.00C.

Nagai, Kenichi: *See—*
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, 4,176,091, Cl. 252-456.000.

Nagai, Yutaka: *See—*
Sakakibara, Shumpei; Nagai, Yutaka; Fujiwara, Kenji; and Sakai, Takahiro, 4,176,009, Cl. 435-24.000.

Naganuma, Tsutomu; Hoshi, Hisao; Kumagai, Hiroji; and Yoshida, Kaneki, to Toppan Printing Co., Ltd. Dry planographic printing method and plate made by electrophotographic method using conductive toner. 4,175,958, Cl. 430-49.000.

Nagata, Yukio; Satoh, Eiji; and Tsuchida, Keinosuke, to Nippon Columbia Kabushiki Kaisha. Electromagnetic pickup device. 4,175,461, Cl. 84-1.150.

Nagel, Dieter H.: *See—*
Weiler, Gerhard H.; Nagel, Dieter H.; and Pagels, Louis T., 4,176,153, Cl. 264-524.000.

Nakada, Masahiko: *See—*
Sanada, Masakatsu; Ito, Toshimitsu; and Nakada, Masahiko, 4,175,527, Cl. 123-136.000.

Nakajima, Yoshio: *See—*
Kamachi, Shinichi; Izawa, Masao; Gocho, Nagahiro; Nakajima, Yoshio; and Hattori, Shinichiro, 4,176,376, Cl. 358-107.000.

Nakamura, Ichiro; Ichiryu, Ken; and Kuwayama, Masatoshi, to Hitachi, Ltd. Fluid pressure drive device. 4,175,589, Cl. 137-625.640.

Nakamura, Michiharu: *See—*
Kajimura, Takashi; Saito, Kazutoshi; Shige, Noriyuki; Nakamura, Michiharu; Umeda, Jun-ichi; and Kobayashi, Masayoshi, 4,176,325, Cl. 331-94.50H.

Nakanishi, Hajime: *See—*
Kawabe, Naoshi; Kaji, Hisatsugu; Miwa, Naotaka; Nakanishi, Hajime; Tanaka, Fumiaki; and Inoue, Tatsuya, 4,175,708, Cl. 241-16.000.

Nakanishi, Sadao; Suzuki, Kazuhiro; Tokura, Nobufumi; and Endo, Shinichiro, to Shinko Electric Co., Ltd. Method for enhancing the reliability of output data from a label reader. 4,175,693, Cl. 235-463.000.

Nakano, Gregory S.: *See—*
Wilger, John F.; Nakano, Gregory S.; Uyetake, Tadao; Orillo, Stephen, Jr.; and Higa, Teikichi, 4,175,471, Cl. 408-83.500.

Nakano, Takashi: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,175,851, Cl. 355-14.00R.

Nakao, Sho: *See—*
Shinozaki, Fumiaki; Washigawa, Yasuo; Ikeda, Tomoaki; Nakao, Sho; and Kondoh, Syunichi, 4,175,971, Cl. 430-287.000.

Nakase, Takamichi: *See—*
Hattori, Tadashi; Takata, Akira; Fukuda, Tamotsu; and Nakase, Takamichi, 4,175,521, Cl. 123-119.00D.

Nakatani, Shuichi: *See—*
Matsuura, Ryo; Nakatani, Shuichi; Nomiyama, Yukio; and Ninomiya, Tadashi, 4,176,125, Cl. 260-369.000.

Nakazawa, Koji; Kikuchi, Toshiaki; and Fujita, Toshihito, to Nitto Boseki Co., Ltd. Method and apparatus for introduction of glass filament strand onto feed roller of chopped glass filament strands manufacturing system. 4,175,939, Cl. 65-2.000.

Nash, Dudley O., to General Electric Company. Thrust reverser for an asymmetric aircraft exhaust nozzle. 4,175,385, Cl. 60-230.000.

Naslain, Rober: *See—*
Quenisset, Jean-Michel; Naslain, Rober; and Hagenmuller, Paul, 4,176,002, Cl. 156-601.000.

National Carbonising Company Limited: *See—*
Elderfield, Kenneth J.; and Griffiths, Charles, 4,175,421, Cl. 73-3.000.

National Research Development Corporation: *See—*
Harriman, Anthony; and Porter, George, 4,176,026, Cl. 204-157.10R.

National Research Institute for Metals: *See—*
Koguchi, Nobuyuki; and Masumoto, Katashi, 4,176,370, Cl. 357-30.000.

National Semiconductor Corporation: *See—*
Compton, James B., 4,176,368, Cl. 357-22.000.
Dobkin, Robert C.; and Pease, Robert A., 4,176,308, Cl. 323-4.000.

National Starch and Chemical Corporation: *See—*
Caimi, Ronald J.; and Schlauch, Walter F., 4,176,108, Cl. 260-29.6TA.

Natori, Minoru: *See—*
Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Ohno, Hideshi; and Natori, Minoru, 4,175,372, Cl. 58-5.000.

Navlyt, Gerald S., to Union Special Corporation. Method and apparatus for forming an overedge stitch. 4,175,499, Cl. 112-165.000.

NCR Corporation: *See—*
Brower, Ronald W.; Cohen, Jerome; and Chen, Peter C., 4,176,003, Cl. 430-313.000.

Nebell, Hans G. T., to Ardal og Sunndal Verk a.s. Conductor arrangement for compensating for horizontal magnetic fields in pots containing a molten electrolytic bath. 4,176,037, Cl. 204-243.00M.

Needham, Donald G., to Phillips Petroleum Company. Arc resistant composition. 4,176,098, Cl. 260-18.00R.

Negita, Mutsumi, to Matsushima Kogyo Kabushiki Kaisha. Method for forming a quartz crystal vibrator. 4,176,030, Cl. 204-192.00R.

Nelson, Alfred M., to AM International, Inc. High density magnetic image recording head. 4,176,362, Cl. 346-74.100.
Nelson, Hugh W., to Combustion Engineering, Inc. Sodium oxide fume for sulfur oxide removal. 4,176,163, Cl. 423-242.000.
Nelson, Norman A., to Upjohn Company, The. Composition and process. 4,176,236, Cl. 568-838.000.
Nelson, Owen L.: *See*—
Korn, Donald M.; and Nelson, Owen L., 4,176,275, Cl. 250-213.00R.
Nelson, Richard D.; and Hughes, A. James, to Rockwell International Corporation. Image sensor having improved moving target discernment capabilities. 4,176,369, Cl. 357-24.000.
Nelson, Roger W.: *See*—
Figueras, John; Nelson, Roger W.; and Sutton, Richard C., 4,176,008, Cl. 435-12.000.
Nemets, Rusaam S.: *See*—
Adamovich, Anatoly V.; Burov, Lev A.; Nemets, Rusaam S.; Gorbulev, Efim S.; Eremenko, Boris S.; Brainman, Felix A.; Moldavanov, Viktor P.; Kontsov, Jury M.; Axenov, Viktor F.; and Averbukh, Matvei I., 4,175,758, Cl. 277-220.000.
Neumann, Paul G. Method and apparatus for manufacturing door frames. 4,175,313, Cl. 29-430.000.
Neustadt, Bernard R.; and Zampaglione, Nicola, to Schering Corporation. 2-[4-(Polyhalo-2-hydroxy-2-propyl)anilino]thiazolin-4-ones. 4,176,120, Cl. 548-184.000.
Nevitt, Thomas D.: *See*—
Corns, Joseph B.; Nevitt, Thomas D.; and Hertwig, Waldemar R., 4,176,048, Cl. 208-59.000.
New Archery Products Corp.: *See*—
Simo, Miroslav A., 4,175,749, Cl. 273-106.50B.
New England Log Homes, Inc.: *See*—
Paris, Alfonso A., Jr.; and Muscanell, Douglas W., 4,175,458, Cl. 83-268.000.
New England Mutual Life Insurance Company: *See*—
Ranauro, Carmine J., 4,175,776, Cl. 283-8.00B.
Newell Dunford Engineering Limited: *See*—
Corrigan, Patrick, 4,176,055, Cl. 209-152.000.
Newkirk, John B.: *See*—
Arenberg, Irving K.; and Newkirk, John B., 4,175,563, Cl. 128-350.00V.
Newsome, David S.: *See*—
Leftin, Harry P.; and Newsome, David S., 4,176,045, Cl. 208-48.00R.
Newton, Barry N., to Lafayette Pharmacal Inc. Iodo-aryl carbonates for use in methods in radiography. 4,175,544, Cl. 128-654.000.
Ni-Tec, Inc.: *See*—
Paksver, Serge; and Szegho, Constantin S., 4,175,808, Cl. 316-19.000.
Niagara Bottle Washer Mfg. Company: *See*—
Vamvakas, Michael, 4,176,067, Cl. 210-256.000.
Niebylski, Leonard M., to Ethyl Corporation. Fuel compositions for reducing hydrocarbon emissions. 4,175,927, Cl. 44-68.000.
Nielson, Juan F.: *See*—
Stephens, Warren J.; and Nielson, Juan F., 4,175,293, Cl. 4-209.00R.
Nifco Inc.: *See*—
Hara, Kunio, 4,175,435, Cl. 73-313.000.
Nijman, John P., to Bunker Ramo Corporation. Conductor terminating apparatus. 4,175,320, Cl. 29-749.000.
Nilberg, Reinhold H. Windmotor as a windbreak. 4,175,910, Cl. 416-8.000.
Niles, Gerald J., to Minnesota Mining and Manufacturing Company. Tape dispenser with blade guard. 4,175,685, Cl. 225-19.000.
Ninomiya, Tadashi: *See*—
Matsuura, Ryo; Nakatani, Shuichi; Nomiyama, Yukio; and Ninomiya, Tadashi, 4,176,125, Cl. 260-369.000.
Nintendo Co., Ltd.: *See*—
Yokoi, Gunpei, 4,175,748, Cl. 273-101.200.
Nippon Columbia Kabushiki Kaisha: *See*—
Nagata, Yukio; Satoh, Eiji; and Tsuchida, Keinosuke, 4,175,461, Cl. 84-1.150.
Nippon Electric Co., Ltd.: *See*—
Yoshioka, Nobuya, 4,176,405, Cl. 365-15.000.
Nippon Oil Co., Ltd.: *See*—
Kaiya, Atsushi; Otsuki, Yutaka; and Horii, Hideo, 4,176,109, Cl. 260-31.2MR.
Tsuchiya, Shozo; Hayashi, Hideo; Sasaki, Makoto; Goto, Kiyoshi; and Ihida, Kazuyoshi, 4,176,146, Cl. 525-338.000.
Nippon Oil and Fats Co., Ltd.: *See*—
Hattori, Katsuhide; and Takahashi, Masao, 4,175,990, Cl. 149-21.000.
Nippon Oil Seal Industry Co., Ltd.: *See*—
Mikami, Yasuo, 4,175,332, Cl. 33-174.00R.
Nippon Petroleum Company, Limited: *See*—
Otsuki, Yutaka; Araki, Yoshihiko; and Aoyama, Kazuho, 4,176,110, Cl. 260-31.80N.
Nippon Soken, Inc.: *See*—
Hattori, Tadashi; Takata, Akira; Fukuda, Tamotsu; and Nakase, Takamichi, 4,175,521, Cl. 123-119.00D.
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,175,386, Cl. 60-276.000.
Kawai, Hisasi; and Iwase, Kazuo, 4,175,507, Cl. 123-117.00D.
Noguchi, Masaaki; Sumiyoshi, Masaharu; Bunda, Tsuchio; and Tanaka, Taro, 4,175,523, Cl. 123-119.00A.
Nippon Telegraph and Telephone Public Corporation: *See*—
Ishida, Akira; and Yamada, Hajime, 4,176,290, Cl. 307-306.000.
Nippondenso Co., Ltd.: *See*—
Miura, Motohisa, 4,175,387, Cl. 60-290.000.
Nishizawa, Katsuhiko: *See*—
Ishii, Kiminori; and Nishizawa, Katsuhiko, 4,175,631, Cl. 180-309.000.
Nissan Motor Co., Ltd.: *See*—
Ishii, Kiminori; and Nishizawa, Katsuhiko, 4,175,631, Cl. 180-309.000.
Morimoto, Yoshiro, 4,175,392, Cl. 60-561.000.
Nitto Boseki Co., Ltd.: *See*—
Nakazawa, Koji; Kikuchi, Toshiaki; and Fujita, Toshihito, 4,175,939, Cl. 65-2.000.
Niveau AG, Firma: *See*—
Halm, Hans, 4,175,663, Cl. 209-610.000.
Noami, Tsuneo: *See*—
Sadamatsu, Shigeru; Nozaki, Tooru; Yamada, Yoshihiko; and Noami, Tsuneo, 4,175,962, Cl. 430-109.000.
Noda, Kinzaburo: *See*—
Maekawa, Hideyuki; Noda, Kinzaburo; and Hoshi, Noboru, 4,176,175, Cl. 424-35.000.
Noe, Frank H. Gasoline flow control device and method for using same. 4,175,595, Cl. 141-1.000.
Nogami, Tomoyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Hydraulic brake pressure control apparatus for motor vehicles. 4,175,791, Cl. 303-24.00A.
Noguchi, Masaaki; Sanda, Shougo; and Takizawa, Masaaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine with an auxiliary combustion chamber. 4,175,501, Cl. 123-30.00D.
Noguchi, Masaaki; Sumiyoshi, Masaharu; Bunda, Tsuchio; and Tanaka, Taro, to Nippon Soken, Inc. Internal combustion engine and a method for operation thereof. 4,175,523, Cl. 123-119.00A.
Nolan, Clyde E., Jr.; and Tillinghast, William S., to Brown & Root, Inc. Methods and apparatus for anchoring offshore pipeline. 4,175,620, Cl. 166-343.000.
Nomiyama, Yukio: *See*—
Matsuura, Ryo; Nakatani, Shuichi; Nomiyama, Yukio; and Ninomiya. Tadashi, 4,176,125, Cl. 260-369.000.
Nooyen, Ray E., to Sperry Rand Corporation. Material flow retarders. 4,175,568, Cl. 130-27.00T.
Noranda Mines Limited: *See*—
Rosenblum, Frank R., 4,175,426, Cl. 73-61.400.
Norris, Neil J., to United States of America, Energy. Electrical pulse generator. 4,176,285, Cl. 307-106.000.
Norton, William W.; and Boehmer, Henry, to Baxter Travenol Laboratories, Inc. Method of manufacturing a flexible collapsible container with a stiffening member. 4,175,994, Cl. 156-251.000.
Novak, Mark C.: *See*—
McDonald, James A.; and Novak, Mark C., 4,175,673, Cl. 221-63.000.
Nozaki, Tooru: *See*—
Sadamatsu, Shigeru; Nozaki, Tooru; Yamada, Yoshihiko; and Noami, Tsuneo, 4,175,962, Cl. 430-109.000.
Nozawa, Shiyozo; Hokari, Saburo; Yamaga, Shigeru; and Takahashi, Akira, to Ricoh Company, Ltd. Motor-operated film winding apparatus. 4,175,846, Cl. 354-173.000.
Nunez, Carl W.; and Squyres, Joseph S., to Halliburton Company. Releasing tool. 4,175,778, Cl. 285-3.000.
Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., to William H. Rorer, Inc. Method of treatment. 4,176,198, Cl. 424-330.000.
O.N.E.R.A. - Office National d'Etudes et de Recherches Aerospatiales: *See*—
El Gammal, Maurice; and Rabinovitch, Maurice, 4,175,609, Cl. 164-60.000.
Oakes, James G.: *See*—
Driver, Michael C.; Oakes, James G.; and Davis, John R., 4,176,295, Cl. 315-39.000.
Oakley, David E.: *See*—
Hahn, Thomas M.; Lohmus, Ivar; and Oakley, David E., 4,175,617, Cl. 165-122.000.
O'Connell, Timothy R.: *See*—
Leach, George S.; and O'Connell, Timothy R., 4,176,289, Cl. 307-270.000.
Odell, Robert, to Harman International Industries, Inc. Transistorized power amplifier. 4,176,323, Cl. 330-263.000.
Oden, Laurance L.; and Russell, James H., to United States of America, Energy. Self-disintegrating Raney metal alloys. 4,175,954, Cl. 75-138.000.
Odlen, Lars; and Hansson, Anders, to Transcale A.B. Modular switching system. 4,176,251, Cl. 179-1.0SW.
Oesterreichisch-Amerikanische Magnesit Aktiengesellschaft: *See*—
Grabner, Bernd E.; and Heinricher, Mario G., 4,175,974, Cl. 106-58.000.
Ogiyama, Hisao: *See*—
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, 4,176,091, Cl. 252-456.000.
Ohbayashi-Gumi Co., Ltd.: *See*—
Ozasa, Masahiro; Murayama, Kenya; and Okumura, Masako, 4,175,814, Cl. 241-46.00R.
Ohno, Hideshi: *See*—
Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Ohno, Hideshi; and Natori, Minoru, 4,175,372, Cl. 58-5.000.
Ohno, Shigeaki; Kazuta, Toshiyuki; and Iwata, Takeshi, to Otsuka Kagaku Yakuhin Kabushiki Kaisha. Process for preparing hydrazodicarbonamide. 4,176,135, Cl. 260-554.000.

Ohta, Hideo: *See—*
Kawamura, Hideo; Ohta, Hideo; and Kubota, Kimi, 4,175,522, Cl. 123-119.00A.

Okumura, Masako: *See—*
Ozasa, Masahiro; Murayama, Kenya; and Okumura, Masako, 4,175,814, Cl. 241-46.00R.

Ollivier, Jean: *See—*
Richard, Louis, 4,175,579, Cl. 137-119.000

Olson, B. Newell, to Dominion Pharmacal, Inc. Method for treating acne vulgaris. 4,176,197, Cl. 424-319.000.

Olympus Optical Company Limited: *See—*
Fujie, Tetsuo; and Ito, Hiromi, 4,176,273, Cl. 219-220.000.
Kamachi, Shinichi; Izawa, Masao; Gocho, Nagahiro; Nakajima, Yoshio; and Hattori, Shinichiro, 4,176,376, Cl. 358-107.000.
Sato, Eiichi, 4,175,957, Cl. 430-31.000.

Ondetti, Miguel A.; and Weisenborn, Frank L., to E. R. Squibb & Sons, Inc. Substituted acyl derivatives of amino acids. 4,176,235, Cl. 562-556.000.

Onikov, Eduard A.; Galperin, Alexandr L.; Zabotin, Alexandr A.; Loschilin, Evgeny D.; and Kolobanov, Nikolai I. Apparatus for threading weft carriers for travelling-wave loom. 4,175,594, Cl. 139-436.000.

Orain, Michel, to Glaenzer Spicer. Homokinetic joint allowing a large angular displacement. 4,175,407, Cl. 64-21.000.

Oratronics, Inc.: *See—*
Chiarenza, Angelo R.; and Weiss, Charles M., 4,175,565, Cl. 433-32.000.

Orillo, Stephen, Jr.: *See—*
Wilger, John F.; Nakano, Gregory S.; Uyetake, Tadao; Orillo, Stephen, Jr.; and Higa, Teikichi, 4,175,471, Cl. 408-83.500.

Orlowski, David C., to Inpro, Inc. Two stage labyrinth pattern inclusion device. 4,175,752, Cl. 277-53.000.

Orova, Josef; and Podrapsky, Jiri, to Robert Bosch GmbH. Magneto ignition system for an internal combustion engine. 4,175,509, Cl. 123-117.00R.

Orrell, Derrell D.; and McFeeters, Melvin M., to Continental Oil Company. Removal of organic compounds from coker gasoline. 4,176,047, Cl. 208-51.000.

Ortho Pharmaceutical Corp.: *See—*
Kanojia, Ramesh M.; Wachter, Michael P.; and Chen, Robert H. K., 4,176,188, Cl. 424-270.000.

Osaka, Susumu: *See—*
Toda, Minoru; Osaka, Susumu; and Matsumoto, Yasushi, 4,176,378, Cl. 358-128.000.

Osmundson, Eric C.: *See—*
Miller, Keith A.; and Osmundson, Eric C., 4,175,396, Cl. 62-63.000.

O'Sullivan, Thomas D., to Bell Telephone Laboratories, Incorporated. Fabrication of alkaline batteries. 4,176,021, Cl. 204-96.000.

Otis Engineering Corporation: *See—*
Rice, Patrick W., 4,175,987, Cl. 148-36.000.

Otsuka Kagaku Yakuhin Kabushiki Kaisha: *See—*
Ohno, Shigeaki; Kazuta, Toshiyuki; and Iwata, Takeshi, 4,176,135, Cl. 260-554.000.

Otsuki, Yutaka; Araki, Yoshihiko; and Aoyama, Kazuho, to Nippon Petroleum Company, Limited. Electrocoating composition for cathodic electrodepositions. 4,176,110, Cl. 260-31.80N.

Otsuki, Yutaka: *See—*
Kaiya, Atsushi; Otsuki, Yutaka; and Horii, Hideo, 4,176,109, Cl. 260-31.2MR.

Ott, Robert J.: *See—*
Haley, Neil F.; Krutak, James J.; and Ott, Robert J., 4,175,956, Cl. 430-37.000.

Oudem, Leon. Process for obtaining gelatin. 4,176,117, Cl. 260-118.000.

Overdeck, John M.: *See—*
Overdeck, John S.; and Overdeck, John M., 4,175,731, Cl. 266-142.000.

Overdeck, John S.; and Overdeck, John M. Method and means for utilizing waste heat of molten slag. 4,175,731, Cl. 266-142.000.

Overly, Inc,: *See—*
Chaffee, David H.; and Tipler, Earl L., 4,175,800, Cl. 308-9.000.

Owen, Leslie J., to British Steel Corporation. Gas monitors. 4,175,422, Cl. 73-23.000.

Owens-Corning Fiberglas Corporation: *See—*
Lonberger, John W., 4,176,401, Cl. 364-900.000.
Marzocchi, Alfred; Roberts, Michael G.; and Bolen, Charles E., 4,175,978, Cl. 106-281.00R.

Owens-Illinois, Inc.: *See—*
Rapp, James E., 4,175,988, Cl. 148-189.000.

Oxy Metal Industries Corporation: *See—*
Martin, Sylvia, 4,176,017, Cl. 204-55.00R.

Oyamada, Masanao: *See—*
Hasebe, Sukehiro; and Oyamada, Masanao, 4,175,376, Cl. 58-23.00R.

Ozasa, Masahiro; Murayama, Kenya; and Okumura, Masako, to Ohbayashi-Gumi Co., Ltd.; and KYC Machine Industry Co. Crusher for solid materials transported by pressurized liquid. 4,175,814, Cl. 241-46.00R.

P. Ferrero & C. S.p.A.: *See—*
Dogliotti, Amilcare, 4,175,665, Cl. 211-49.00D.

Pabst, Rolf; and Jenz, Siegfried, to Dailmler-Benz Aktiengesellschaft; and Suddeutsche Kuhlerfabrik Julius Fr. Behr. Equalization tank for cooling liquid. 4,175,616, Cl. 165-107.00D.

Pachuta, Martin: *See—*
Dehne, Clarence A.; and Pachuta, Martin, 4,175,657, Cl. 198-833.000.

Pack, Ardis I.: *See—*
Pack, Yongik; and Paek, Ardis I., 4,175,925, Cl. 44-35.000.

Pack, Yongik; and Paek, Ardis I. Charcoal-starter apparatus. 4,175,925, Cl. 44-35.000.

Pagels, Louis T.: *See—*
Weiler, Gerhard H.; Nagel, Dieter H.; and Pagels, Louis T., 4,176,153, Cl. 264-524.000.

Paixao, Jose Marcio Jardim; and de Mendonca, Paulo Ayres Falcao. Process for concentration of titanium containing anatase ore. 4,176,159, Cl. 423-80.000.

Pako Corporation: *See—*
Baert, Victor R., 4,175,852, Cl. 355-35.000.
Harvey, Ronald B., 4,175,853, Cl. 355-38.000.
Pone, John, Jr., 4,175,856, Cl. 355-68.000.

Pakswer, Serge; and Szegho, Constantin S., to Ni-Tec, Inc. Method and apparatus for producing electronic devices. 4,175,808, Cl. 316-19.000.

Palacino, Giovanni: *See—*
Radice, Angelo; and Palacino, Giovanni, 4,175,500, Cl. 112-166.000.

Palmer, Arlo K., to United States of America, Air Force. Electrically conductive bonding strap for connecting movable parts. 4,175,812, Cl. 339-29.00R.

Palmer Engineering Company Ltd.: *See—*
Black, Donald S., 4,176,064, Cl. 210-196.000.

Palmer, Norman H. G., to Towmotor Corporation. Control circuit for a contactor. 4,176,388, Cl. 361-196.000.

Pampouchidis, Georgios; and Honig, Helmut, to Vianova Kunstharz, A.G. Self-crosslinking cationic resin emulsions for use in electrodeposition paints. 4,176,099, Cl. 260-18.0TN.

Panneciere, Charles A.: *See—*
Winchell, Harry S.; Lin, Tz-Hong; and Panneciere, Charles A., 4,176,173, Cl. 424-5.000.

Pannwitz, Hans U. Flexible spring bearing. 4,175,804, Cl. 308-26.000.

Parad, Leonard I.: *See—*
DiTullio, Joseph G.; Parad, Leonard I.; and Sommers, Donald J., 4,176,330, Cl. 333-122.000.

Paris, Alfonso A., Jr.; and Muscanell, Douglas W., to New England Log Homes, Inc. Cut-off saw. 4,175,458, Cl. 83-268.000.

Parker, Alfred B.: *See—*
Scragg, Robert L.; and Parker, Alfred B., 4,175,381, Cl. 60-39.120.

Parker, Calvin E. Apparatus for centering strips in rolling mills and the like. 4,175,689, Cl. 226-190.000.

Parker, Louis W. Energy economizing AC power control system. 4,176,307, Cl. 318-798.000.

Parker, Robert D.: *See—*
Buritz, Robert S.; Parker, Robert D.; Kisch, Jack J.; and Burnham, John, 4,176,334, Cl. 336-84.00C.

Parsons, Basil I.: *See—*
Ternan, Marten; and Parsons, Basil I., 4,176,051, Cl. 208-112.000.

Partridge, Charles C.: *See—*
Kacal, Gary W.; and Partridge, Charles C., 4,175,577, Cl. 137-15.000.

Pascuzzi, E. Anthony: *See—*
Cornell, William F.; Vear, John P.; and Pascuzzi, E. Anthony, 4,175,691, Cl. 229-36.000.

Pastakia, Percy N.: *See—*
George, James S.; Ward, Arthur G. T.; and Pastakia, Percy N., 4,176,157, Cl. 422-114.000.

Patel, Bhupendra C., to Kendall Company, The. Method of locating the epidural space. 4,175,567, Cl. 128-748.000.

Patterson, Billy J. Indicator to show whether a switch has opened. 4,176,350, Cl. 340-644.000.

Patterson, George; Putman, Edgar N.; and McCool, John B., III, to PFD/Penn Color, Inc. Predispersed composition for use in thermosetting acrylic automotive finishes. 4,176,096, Cl. 260-15.000.

Patula, Edward: *See—*
Johnson, Ralph W.; Burrs, Emil D.; Smith, Gary L.; Freund, Ronald G.; and Patula, Edward, 4,175,674, Cl. 221-88.000.

Paul Hartmann AG: *See—*
Knoll, Ernst, 4,175,560, Cl. 128-269.000.

Pauwels, Edward M., to Bendix Corporation, The. Modulator valve for a spinning and skidding wheel assembly. 4,175,794, Cl. 303-105.000.

Pavonet, Engelhard, to Societe de Prayon. Process for purifying a zinc sulfate solution. 4,176,160, Cl. 423-104.000.

Paynter, Gerald C.: *See—*
Birch, Stanley F.; Lawler, John A.; and Paynter, Gerald C., 4,175,640, Cl. 181-213.000.

Pearson, Robert P., to Honeywell Inc. Radar altimeter tracking circuit apparatus. 4,176,353, Cl. 343-12.00A.

Pease, Robert A.: *See—*
Dobkin, Robert C.; and Pease, Robert A., 4,176,308, Cl. 323-4.000.

Peay, Robert L.: *See—*
Tobin, Joseph J.; Robinson, David B.; Peay, Robert L.; Powell, Jerry R.; and Gay, Leslie W., 4,176,348, Cl. 340-562.000.

Pedone, Antonio, to Societe dite Coppertron S.A. Installation for the production of a copper foil intended to be applied to a dielectric substrate. 4,176,035, Cl. 204-205.000.

Pekau, Dietlind; Ruell, Hartwig; Storck, Eckhard; and Kiemle, Horst, to Siemens Aktiengesellschaft. Process for holographic recording of data in the form of electrical signals. 4,175,823, Cl. 350-3.790.

PEM-IMS, Inc.: *See—*
Smith, Joseph F.; and Smith, Joseph R., 4,175,405, Cl. 64-10.000.

Pennish, John S.: *See—*
Carman, Justice N., 4,176,166, Cl. 423-350.000.

Pennwalt Corporation: *See—*
Cushman, Robert H., 4,176,278, Cl. 250-439.00P.

Grier, Jesse G., 4,176,056, Cl. 210-20.000.

Pera, John D.: *See—*
Buckman, John D.; Hunter, Wood E.; Pera, John D.; and Taylor, Robert M., 4,176,107, Cl. 260-29.60E.

Peters, Alan W.: *See—*
Chen, Nai Y.; Garwood, William E.; and Peters, Alan W., 4,176,050, Cl. 208-111.000.

Peterson, James J., to Kendall Company, The. Irrigation solution device. 4,175,597, Cl. 141-23.000.

Peterson, Ralph L. Apparatus for removing a fitting. 4,175,581, Cl. 137-319.000.

Petinaux, Marcel; Dieterich, Dieter; and Markusch, Peter, to Bayer Aktiengesellschaft. Aromatic uretdione-diisocyanate-disulphonic acids. 4,176,118, Cl. 260-239.00A.

Peytavin, Pierre, to Vallourec (Usines a Tubes de Lorraine-Escaut et Vallourec Reunies). Smoothing rolling mill. 4,175,414, Cl. 72-96.000.

PFD/Penn Color, Inc.: *See—*
Patterson, George; Putman, Edgar N.; and McCool, John B., III, 4,176,096, Cl. 260-15.000.

Pfenninger, Hans, to BBC Brown Boveri & Company Limited. Steam power plant with pressure-fired boiler. 4,175,382, Cl. 60-39.18B.

Pfizer Inc.: *See—*
Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, 4,176,172, Cl. 423-634.000.
Melvin, Lawrence S., Jr., 4,176,196, Cl. 424-308.000.
Schnur, Rodney C., 4,176,185, Cl. 424-258.000.

Phaup, Charles W.; and Lower, Joseph D., to JBC Enterprises, Inc. Subfloor for offshore production platform. 4,175,889, Cl. 405-195.000.

Phelan, Michael B., to ACF Industries, Incorporated. Apparatus for venting fuel vapors from a carburetor fuel bowl. 4,175,526, Cl. 123-136.000.

Philip Morris Incorporated: *See—*
Raynor, Robert H., 4,175,715, Cl. 242-72.100.

Phillips Petroleum Company: *See—*
Bertus, Brent J.; and Walker, Darrell W., 4,176,140, Cl. 585-629.000.
Carter, Cecil O., 4,176,086, Cl. 252-429.00B.
Dixon, Rolland E., 4,176,141, Cl. 585-314.000.
Jackson, Henry G., 4,176,211, Cl. 428-397.000.
Needham, Donald G., 4,176,098, Cl. 260-18.00R.
Warzel, Fred M., 4,175,870, Cl. 366-76.000.

Piazza, Matthew R., to Maso-Therm Corp. Process and apparatus for static mixing. 4,175,867, Cl. 366-9.000.

Pickett, Vaughn A. Toy simulated ray gun. 4,175,353, Cl. 46-227.000.

Piguet, Pierre, to Ateliers des Charmilles S.A. Hydraulic installation. 4,175,707, Cl. 239-456.000.

Pilgrim Engineering Developments Limited: *See—*
Bunyan, Thomas W., 4,175,311, Cl. 29-402.180.

Pioth, Michael J. Stretcher. 4,175,783, Cl. 296-20.000.

Pitney-Bowes, Inc.: *See—*
Bujese, David P., 4,175,850, Cl. 355-13.000.

Pizette, Seymour B.: *See—*
Fassett, Matthew; Pizette, Seymour B.; and Toth, John F., 4,176,359, Cl. 343-854.000.

Platz, Rolf; Dockner, Toni; Heners, Jurgen; and Krug, Herbert, to BASF Aktiengesellschaft. Manufacture of carboxylic acid amides. 4,176,137, Cl. 260-561.00N.

Plaubel, Feinmechanik & Optik GmbH: *See—*
Schrader, Goetz, 4,175,847, Cl. 354-187.000.

Plischke, LeMoyne W.: *See—*
Baggett, William M.; and Plischke, LeMoyne W., 4,176,227, Cl. 528-488.000.

Podrapsky, Jiri: *See—*
Orova, Josef; and Podrapsky, Jiri, 4,175,509, Cl. 123-117.00R.

Poeschl, Paul M.; and Stockwell, David L., to Ansul Company, The. Self-contained actuation and detection device. 4,175,677, Cl. 222-5.000.

Poggemiller, Randy L.: *See—*
Herzog, Stanley M.; and Poggemiller, Randy L., 4,175,902, Cl. 414-339.000.

Polaroid Corporation: *See—*
Douglas, Lawrence M., 4,175,843, Cl. 354-31.000.

Poly-Glas Systems: *See—*
Hetherington, Robert D.; and Goelz, David W., 4,175,702, Cl. 239-113.000.

Ponce, Phillip; and Kamon, John T., to Smith, Carolyn M., a part interest. Timer-controlled automatic animal feed dispenser. 4,175,679, Cl. 222-70.000.

Pone, John, Jr., to Pako Corporation. Photographic printer with automatic density and color corrections for paper gamma. 4,175,856, Cl. 355-68.000.

Pont-A-Mousson S.A.: *See—*
Lippera, Noel, 4,176,274, Cl. 219-522.000.

Ponticello, Gerald S.: *See—*
Baldwin, John J.; and Ponticello, Gerald S., 4,176,183, Cl. 424-248.520.

Porkhun, Fedor K.: *See—*
Kuchuk-Yatsenko, Sergei I.; Golomovzjuk, Ivan K.; Krivenko, Valery G.; Kulesh, Alexandr I.; Sakharnov, Vasily A.; Lazebny, Ivan L.; and Porkhun, Fedor K., 4,175,897, Cl. 409-300.000.

Porta Systems Corp.: *See—*
DeLuca, Paul V., 4,176,257, Cl. 179-98.000.

Porter, George: *See—*
Harriman, Anthony; and Porter, George, 4,176,026, Cl. 204-157.10R.

Porter, Robert P.: *See—*
Spindel, Robert C.; Porter, Robert P.; and Marquet, William M., 4,176,338, Cl. 367-6.00E.

Pospischil, Albert R.; Bruegman, Michael L.; and Granberg, Erlang W., to Precision Fabricators, Inc. Newspaper vending machine. 4,175,989, Cl. 194-1.00C.

Postalia GmbH: *See—*
Muller, Wilhelm, 4,175,880, Cl. 402-48.000.

Postma, Lambertus: *See—*
Koel, Gerrit J.; and Postma, Lambertus, 4,176,016, Cl. 204-38.00R.

Powell, Jerry R.: *See—*
Tobin, Joseph J.; Robinson, David B.; Peay, Robert L.; Powell, Jerry R.; and Gay, Leslie W., 4,176,348, Cl. 340-562.000.

Powers, Vernon B., to E-Systems, Inc. MOS-bipolar printer driver circuit. 4,176,272, Cl. 219-216.000.

PPG Industries, Inc.: *See—*
Darlington, William B., 4,176,022, Cl. 204-98.000.
Hargett, William D.; and Broun, Thorowgood T., 4,176,165, Cl. 423-245.000.

Pratt, Harry H.; and Money, Dudley P., to Foster Wheeler Energy Corporation. Vapor generator utilizing vertical bars for supporting angularly arranged furnace boundary wall fluid flow tubes. 4,175,519, Cl. 122-510.000.

Pray, Edward R.: *See—*
Demou, John G.; and Pray, Edward R., 4,176,218, Cl. 521-129.000.

Precision Fabricators, Inc.: *See—*
Pospischil, Albert R.; Bruegman, Michael L.; and Granberg, Erlang W., 4,175,989, Cl. 194-1.00C.

Predali, Jean-Jacques, to Minemet Recherche. Process for the preconcentration of metalliferous products. 4,175,790, Cl. 299-7.000.

Preston, Joseph L. Animal trap with sensitive triggering device. 4,175,350, Cl. 43-82.000.

Price, Edward H.: *See—*
Molnar, Charles J.; Price, Edward H.; and Resnick, Paul R., 4,176,215, Cl. 521-27.000.

Priese, Werner K., to Hills-McCanna Company. Fire resistant seat for butterfly and ball valves. 4,175,578, Cl. 137-67.000.

Primus, David R. Method and means for agitating liquid manure. 4,175,872, Cl. 366-139.000.

Princen, Henricus M.; and Aronson, Michael P., to Lever Brothers Company. Method for reducing the surface discoloration of food spreads and food spreads produced thereby. 4,176,200, Cl. 426-250.000.

Princeton Chemical Research, Inc.: *See—*
Magder, Jules; and Reich, Murray H., 4,176,148, Cl. 264-41.000.

Procter & Gamble Company, The: *See—*
Guerry, Raymond E.; and Whyte, David D., 4,176,079, Cl. 252-90.000.
Wise, Rodney M.; and Mitchell, Sharon J., 4,176,080, Cl. 252-162.000.

Produits Chimiques Ugine Kuhlmann: *See—*
Faron, Robert; and Cathala, Annie, 4,176,018, Cl. 204-60.000.

Prost, Roger; and Manhes, Bernard, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Distribution of gas under pressure. 4,175,395, Cl. 62-52.000.

Puckett, Robert O. Articulating grader having structure for raising and lowering mold board without disturbing setting. 4,175,625, Cl. 172-791.000.

Pullman Incorporated: *See—*
Leftin, Harry P.; and Newsome, David S., 4,176,045, Cl. 208-48.00R.

Pungas, Toom A.; Laud, Tynis A.; Reinberg, Kheino A.; Rebane, Raul-Vello P.; and Lumi, Toomas R. A.C. to D.C. voltage converter. 4,176,393, Cl. 363-125.000.

Puretic, Mario J. Stern fishing system. 4,175,347, Cl. 43-6.500.

Putman, Edgar N.: *See—*
Patterson, George; Putman, Edgar N.; and McCool, John B., III, 4,176,096, Cl. 260-15.000.

Quantor Corporation: *See—*
Ammann, Stephen K.; and Herborn, Peter E., 4,175,854, Cl. 355-54.000.
Meadows, John W., 4,175,858, Cl. 355-99.000.

Quatic Chemicals Limited: *See—*
Suzuki, Fumiko, 4,176,059, Cl. 210-58.000.

Quenisset, Jean-Michel; Naslain, Rober; and Hagenmuller, Paul, to Agence Nationale de Valorisation de la Recherche (ANVAR). Controlling the melt temperature during zone refining and Czochralski crystal growth by sensing the viscous torque of the melt zone during operation. 4,176,002, Cl. 156-601.000.

Quick, James R.: *See—*
Heaton, Michael J.; and Quick, James R., 4,175,977, Cl. 106-272.000.

Rabinovitch, Maurice: *See—*
El Gammal, Maurice; and Rabinovitch, Maurice, 4,175,609, Cl. 164-60.000.

Rabinowitz, Mario, to Electric Power Research Institute, Inc. Stored field superconducting electrical machine and method. 4,176,291, Cl. 310-52.000.

Raco-Elektro-Maschinen GmbH: *See—*
Brinkert, Franz, 4,175,645, Cl. 188-72.100.

Radice, Angelo; and Palacino, Giovanni, to Rockwell-Rimoldi S.p.A. Device for aligning chains of stitches in a two-needle sewing machine. 4,175,500, Cl. 112-166.000.

Radiochemical Centre Ltd., The: *See—*
Laidler, John B.; and Abrahams, Roy H., 4,176,158, Cl. 423-2.000.

Rainey, George E.: *See—*
Vollmer, Arthur N.; and Rainey, George E., 4,176,199, Cl. 426-59.000.
Ralston Purina Company: *See—*
Decker, Carl D.; and Holt, S. Kent, 4,176,202, Cl. 426-574.000.
Ramuz, Henri: *See—*
Muller, Jean-Claude; and Ramuz, Henri, 4,176,119, Cl. 260-243.300.
Ramy, Towheed; and Hore, Lal M., to General Cable Corporation. Metallurgical bonded connector for coaxial cables. 4,176,244, Cl. 174-88.00C.
Ranauro, Carmine J., to New England Mutual Life Insurance Company. Counterfeit resistant document. 4,175,776, Cl. 283-8.00B.
Randin, Jean-Paul, to Ebauches S.A. Electro-optic device. 4,175,838, Cl. 350-357.000.
Randolph, John E., to Teletype Corporation. Ribbon cartridge having a convolute-forming roller. 4,175,877, Cl. 400-196.000.
Rank Xerox, Ltd.: *See—*
Sadamatsu, Shigeru; Nozaki, Tooru; Yamada, Yoshihiko; and Noami, Tsuneo, 4,175,962, Cl. 430-109.000.
Rapid Mounting & Finishing Company: *See—*
Rutchik, Robert K., 4,175,345, Cl. 40-473.000.
Rapids, Felix R. Electrode for portable electroplating. 4,176,036, Cl. 204-224.00R.
Rapp, Heinz; Biedermann, Ernst; and Wittenbrink, Dieter, to AGFA-Gevaert, A.G. Photographic copying machine. 4,175,857, Cl. 355-73.000.
Rapp, James E., to Owens-Illinois, Inc. Melt-formed polycrystalline ceramics and dopant hosts containing phosphorus. 4,175,988, Cl. 148-189.000.
Ray, William E. Illuminated fishing lure with magnetic switch. 4,175,348, Cl. 43-17.600.
Raychem Corporation: *See—*
Gotcher, Alan J.; Germeraad, Paul B.; and White, Larry J., 4,176,027, Cl. 204-159.150.
Raynor, Robert H., to Philip Morris Incorporated. Quick change spindle mandrel. 4,175,715, Cl. 242-72.100.
Raytheon Company: *See—*
DeVita, Alphonse J.; Koester, Earl J.; Manoogian, David V.; and Sharenson, Stanley, 4,176,351, Cl. 343-9.00R.
Fassett, Matthew; Pizette, Seymour B.; and Toth, John F., 4,176,359, Cl. 343-854.000.
Raytheon Corporation: *See—*
Baker, Thomas E.; Fix, George L.; and Judge, John S., 4,176,209, Cl. 427-248.00B.
RCA Corporation: *See—*
Babcock, William E.; and Hess, Ronald L., 4,176,303, Cl. 315-400.000.
Huff, Larry D., 4,175,751, Cl. 274-13.00R.
Scott, Howard M., 4,176,304, Cl. 315-411.000.
Toda, Minoru; Osaka, Susumu; and Matsumoto, Yasushi, 4,176,378, Cl. 358-128.000.
Reames, Cedric (Ted) A., Jr. Preheater device for hot water heaters. 4,175,518, Cl. 122-20.00B.
Rebane, Raul-Vello P.: *See—*
Pungas, Toom A.; Laud, Tynis A.; Reinberg, Kheino A.; Rebane, Raul-Vello P.; and Lumi, Toomas R., 4,176,393, Cl. 363-125.000.
Redman, Michael J.; and Satchell, David W., to Xerox Corporation. Method and apparatus for forming visible images. 4,175,836, Cl. 350-357.000.
Redpath Sugars Limited: *See—*
Cormier, Richard A.; and Gagnon, Claude F., 4,176,006, Cl. 435-74.000.
Reen, Orville W.: *See—*
Southern, Raymond L.; and Reen, Orville W., 4,175,921, Cl. 432-261.000.
Regehr, Ulrich; Hannemann, Horst; and Speitkamp, Ludwig, to Regehr, Ulrich. Apparatus for the separation of liquid droplets from a gas stream entraining same. 4,175,938, Cl. 55-440.000.
Rehbein, Glenn, to Robark, Inc. Earth working implement. 4,175,496, Cl. 111-1.000.
Reich, Murray H.: *See—*
Magder, Jules; and Reich, Murray H., 4,176,148, Cl. 264-41.000.
Reichow, James R. Automatic spin cast reel. 4,175,716, Cl. 242-84.20A.
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., to Union Carbide Corporation. Phenol/formaldehyde resoles and cellular products derived therefrom. 4,176,106, Cl. 260-29.300.
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., to Union Carbide Corporation. Cellular products derived from phenol/formaldehyde resoles. 4,176,216, Cl. 521-106.000.
Reinberg, Kheino A.: *See—*
Pungas, Toom A.; Laud, Tynis A.; Reinberg, Kheino A.; Rebane, Raul-Vello P.; and Lumi, Toomas R., 4,176,393, Cl. 363-125.000.
Reliance Electric Corporation: *See—*
Downey, Holmes A., 4,175,406, Cl. 64-13.000.
Remedi, James J., to Motorola, Inc. Versatile CMOS decoder. 4,176,287, Cl. 307-251.000.
Remport, Julia nee Radoczi: *See—*
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.
Renaud, Ronnie C.; and Goins, Jerry D. Apparatus for automatically feeding collar stays. 4,175,676, Cl. 221-211.000.
Resnick, Paul R.: *See—*
Molnar, Charles J.; Price, Edward H.; and Resnick, Paul R., 4,176,215, Cl. 521-27.000.
Restrepo, Jose M. Process for incorporating reinforcing fibers in cementing matrices, using an apparatus comprising vibrating trays. 4,175,868, Cl. 366-9.000.
Reutter, Siegfried: *See—*
Bubik, Alfred; and Reutter, Siegfried, 4,176,005, Cl. 162-256.000.
Reyes, George Q. Step ladder leg support. 4,175,641, Cl. 182-172.000.
Reynolds Metals Company: *See—*
Reynolds, William G.; and Arfert, Horst F. W., 4,175,670, Cl. 220-70.000.
Reynolds, William G.; and Arfert, Horst F. W., to Reynolds Metals Company. Container construction. 4,175,670, Cl. 220-70.000.
Rhythm Watch Company Limited: *See—*
Miyamoto, Kazuo; Suzuki, Isao; and Koide, Hideo, 4,175,373, Cl. 58-16.00D.
Rice, Patrick W., to Otis Engineering Corporation. Low alloy tempered martensitic steel. 4,175,987, Cl. 148-36.000.
Richard, Louis, to Ollivier, Jean. Device for automatic, selective watering of plants. 4,175,579, Cl. 137-119.000.
Richards, Cecil G., to B.C. Richards & Co. Pty. Ltd. Ball valve and seal. 4,175,726, Cl. 251-315.000.
Richardson Company, The: *See—*
Alsberg, Henry; Skalla, Dale; and Meisenhelder, William C., 4,176,104, Cl. 260-28.50R.
Richardson, Robert H.: *See—*
Robbins, William E.; and Richardson, Robert H., 4,175,297, Cl. 5-284.000.
Ricoh Company, Ltd.: *See—*
Nozawa, Shiyozo; Hokari, Saburo; Yamaga, Shigeru; and Takahashi, Akira, 4,175,846, Cl. 354-173.000.
Rider, Dennis G., to Battelle Development Corporation. Ramp generator. 4,176,398, Cl. 364-607.000.
Rider, Nathan R., to Kay Tex Products, Inc. Textured surface coating. 4,176,100, Cl. 260-22.00R.
Riedel, Harald: *See—*
Teschner, Eckart; Riedel, Harald; and Sattelmeyer, Richard, 4,175,931, Cl. 51-297.000.
Rijckaert, Albert M. A.: *See—*
de Niet, Edmond; and Rijckaert, Albert M. A., 4,176,381, Cl. 360-77.000.
Rikuta, Sotokazu. Method of and apparatus for the measurement of the rate of flow by means of a bypass. 4,175,433, Cl. 73-196.000.
Rikuta, Sotokazu. Control valve for keeping the rate of flow at a fixed value. 4,175,584, Cl. 137-504.000.
Rion Co., Ltd.: *See—*
Takinishi, Kiyotoshi; and Hattori, Junichi, 4,175,338, Cl. 35-35.00R.
Ripple, David E., to Lubrizol Corporation, The. Haloalkyl hydroxyaromatic condensation products as lubricant additives. 4,176,077, Cl. 252-51.50R.
Ritland, Harold N.; and Thacker, George H., to United States of America, Air Force. Centrifugal aerosol dispenser assembly. 4,175,469, Cl. 89-1.00B.
Roantree, William J.; and Bartini, Paul S., to Mel Modern Systems, Incorporated. Solar energy collector. 4,175,540, Cl. 126-425.000.
Robark, Inc.: *See—*
Rehbein, Glenn, 4,175,496, Cl. 111-1.000.
Robbins, William E.; and Richardson, Robert H. Inflatable pillow support. 4,175,297, Cl. 5-284.000.
Robert Bosch GmbH: *See—*
Orova, Josef; and Podrapsky, Jiri, 4,175,509, Cl. 123-117.00R.
Schulz, Alfred; Kiencke, Uwe; and Honig, Gunther, 4,176,309, Cl. 323-4.000.
Wesenmeyer, Jurgen; Haubner, Georg; and Meier, Werner, 4,175,508, Cl. 123-117.00R.
Roberts, Derek A., to Rolls-Royce Limited. Bearing assembly between inner and outer shafts having two roller bearings and two hydrodynamic or squeeze film bearings. 4,175,803, Cl. 308-9.000.
Roberts, Michael G.: *See—*
Marzocchi, Alfred; Roberts, Michael G.; and Bolen, Charles E., 4,175,978, Cl. 106-281.00R.
Roberts, Noel A.: *See—*
Hassall, Cedric H.; Johnson, William H.; and Roberts, Noel A., 4,176,116, Cl. 260-112.50R.
Roberts, Thomas E. E., to Lucas Industries Limited. Rotary hydraulic machine. 4,175,472, Cl. 91-6.500.
Robertson, Elmer L., to Ethyl Development Corporation. Article decorating machine and method. 4,175,993, Cl. 156-234.000.
Robertson, George H.; and Stirling, John A., to Ciba-Geigy Corporation. Process for the manufacture of a pigment composition in bead form. 4,175,979, Cl. 106-309.000.
Robertson, Steven J. High performance shredder apparatus. 4,175,710, Cl. 241-55.000.
Robinson, David B.: *See—*
Tobin, Joseph J.; Robinson, David B.; Peay, Robert L.; Powell, Jerry R.; and Gay, Leslie W., 4,176,348, Cl. 340-562.000.
Robinson, L. T.: *See—*
Garthus, Donald R.; and Robinson, L. T., 4,176,013, Cl. 202-242.000.
Rockwell International Corporation: *See—*
Jenkins, David K., 4,175,643, Cl. 184-11.00A.
Molina, Orlando G., 4,176,205, Cl. 427-1.000.
Nelson, Richard D.; and Hughes, A. James, 4,176,369, Cl. 357-24.000.

Rockwell-Rimoldi S.p.A.: *See—*
Radice, Angelo; and Palacino, Giovanni, 4,175,500, Cl. 112-166.000.
Roehrick, Otto A. Quick step ecolarium. 4,175,513, Cl. 119-5.000.
Rogoff, Mortimer: *See—*
DeRosa, Louis A.; and Rogoff, Mortimer, 4,176,316, Cl. 325-32.000.
Rohm and Haas Company: *See—*
Leslie, John P.; Lane, Constance A.; and Grant, R. Peter, 4,176,101, Cl. 260-22.00T.
Lewis, Sheldon N.; and Levy, Jerome F., 4,176,232, Cl. 560-222.000.
Meisinger, Robert H., 4,175,945, Cl. 71-78.000.
Rolls-Royce Limited: *See—*
Crane, John L.; Archdale, Robert W.; and Webb, Alan E., 4,175,912, Cl. 416-193.00A.
Roberts, Derek A., 4,175,803, Cl. 308-9.000.
Rosales, Louis A.: *See—*
Bianchi, Maurice P.; and Rosales, Louis A., 4,175,642, Cl. 184-1.00E.
Rosche, Paul: *See—*
Ederer, Georg; Fischer, Adolf; Rosche, Paul; Troll, Helmar; Wurst, Wolfgang; Hengl, Helmut; and Seidl, Jiri, 4,175,504, Cl. 123-52.00M.
Rose, John B.: *See—*
Cinderey, Michael B.; and Rose, John B., 4,176,222, Cl. 528-126.000.
Rosenberg, Henry W., to Camp International, Inc. Lumbosacral-orthosis orthopedic support. 4,175,553, Cl. 128-78.000.
Rosenblum, Frank R., to Noranda Mines Limited. Apparatus for measuring the sedimentation characteristics of particulate solids in liquid. 4,175,426, Cl. 73-61.400.
Rosenblum, Richard, to Fischer & Porter Co. Digital hypochlorous acid analyzer. 4,176,031, Cl. 204-195.00R.
Rosenschein, Warner: *See—*
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Rosey, Richard: *See—*
Kovatch, George N.; Rosey, Richard; and Simon, Ned H., 4,176,243, Cl. 174-72.00B.
Ross, Joseph A.: *See—*
DiMatteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., 4,175,862, Cl. 356-375.000.
Rotz, Christopher A.: *See—*
Suh, Nam P.; Rotz, Christopher A.; and Erwin, Lewis, II, 4,175,871, Cl. 366-79.000.
Roullier, Marcel-Francois, to Baumgartner Papiers S.A. Cigarette-filter-making apparatus. 4,175,479, Cl. 93-77.0FT.
Rousseau, Jean-Pierre. Switch for pocket torch. 4,176,263, Cl. 200-60.000.
Rovac Corporation, The: *See—*
Edwards, Thomas C.; and Ecker, Amir L., 4,175,397, Cl. 62-149.000.
Edwards, Thomas C.; and Ecker, Amir L., 4,175,398, Cl. 62-172.000.
Edwards, Thomas C.; and Ecker, Amir L., 4,175,399, Cl. 62-172.000.
Edwards, Thomas C.; and Ecker, Amir L., 4,175,400, Cl. 62-174.000.
Royston, John H.: *See—*
Merlack, William A.; and Royston, John H., 4,176,245, Cl. 174-92.000.
Royston Laboratories, Inc.: *See—*
Merlack, William A.; and Royston, John H., 4,176,245, Cl. 174-92.000.
Rubio, Charles A., to CVG-Siderurgica del Orinoco, C.A. Method and apparatus for preparing a reducing gas stream. 4,175,951, Cl. 75-91.000.
Rudisill, John A., Jr., to Bell Telephone Laboratories, Incorporated. Adjustable impedance battery feed circuit. 4,176,255, Cl. 179-16.00F.
Rueggeberg, Werner, to Armstrong Cork Company. Microwave energy trap. 4,176,267, Cl. 219-10.55A.
Ruell, Hartwig: *See—*
Pekau, Dietlind; Ruell, Hartwig; Storck, Eckhard; and Kiemle, Horst, 4,175,823, Cl. 350-3.790.
Ruger, Gerd: *See—*
Frauenhoffer, Josef; and Ruger, Gerd, 4,175,319, Cl. 29-724.000.
Ruggles, Richard L.: *See—*
Evelyn-Veere, Rene H.; and Ruggles, Richard L., 4,176,395, Cl. 364-420.000.
Rugheimer, Norman M.; and Chestnut, Scott R. Holographic puzzle. 4,175,750, Cl. 273-157.00R.
Ruland, Ross R.: *See—*
Guerre, Robert P.; Juedes, Dennis L.; and Ruland, Ross R., 4,175,920, Cl. 431-175.000.
Ruscoe, Michael J. H.; Clegg, Maurice A.; Seibt, Willie H.; and Sarkar, Kshitindra M., to Sherritt Gordon Mines Limited. Process for the production of coin blanks. 4,176,014, Cl. 204-23.000.
Rush-Presbyterian-St. Luke's Medical Center: *See—*
Bacus, James W., 4,175,860, Cl. 356-39.000.
Kuettner, Klaus E., 4,176,177, Cl. 424-95.000.
Russell, Albert C., deceased; and Russell, Mary K., administratrix. Distributor assembly. 4,175,520, Cl. 123-117.00A.
Russell, James H.: *See—*
Oden, Laurance L.; and Russell, James H., 4,175,954, Cl. 75-138.000.
Russell, Mary K., administratrix: *See—*
Russell, Albert C., deceased; and Russell, Mary K., administratrix, 4,175,520, Cl. 123-117.00A.
Russell, Stuart M.; and Bishop, Leonard W. J., to Burroughs Wellcome Co. Viral antibody diagnostic test system. 4,176,174, Cl. 424-8.000.
Rutchik, Robert K., to Rapid Mounting & Finishing Company. Display device. 4,175,345, Cl. 40-473.000.
Ruyle, William V.; and Fisher, Michael H., to Merck & Co., Inc. Substituted dihydropyridine ureas. 4,176,187, Cl. 424-263.000.
Rybicki, Robert C., to United States of America, Army. Helicopter rotor head mounting assembly. 4,175,913, Cl. 416-244.00R.
Rybin, Igor V.: *See—*
Vulis, Mikhail L.; Golenchenko, Valery A.; Rybin, Igor V.; and Shenderovich, Pavel B., 4,176,238, Cl. 174-15.00S.
Ryer, Jack; Winans, Esther D.; Brois, Stanley J.; and Gutierre, Antonio, to Exxon Research & Engineering Co. Molybdenum complexes of lactone oxazoline dispersants as friction reducing antiwear additives for lubricating oils. 4,176,073, Cl. 252-32.70E.
S. A. Martin: *See—*
Gattus, Yves, 4,175,489, Cl. 101-366.000.
Saari, Veikko R.; and Shoji, Masakazu, to Bell Telephone Laboratories, Incorporated. Integrated circuit binary weighted digital-to-analog converter. 4,176,344, Cl. 340-347.0DA.
Sabia, Raffaele A., to Bell Telephone Laboratories, Incorporated. Filled electrical cable. 4,176,240, Cl. 174-23.00C.
Sack, Stanley F., to Canadian General Electric Company Limited. Split duct with integral hinge. 4,175,593, Cl. 138-110.000.
Sadamatsu, Shigeru; Nozaki, Tooru; Yamada, Yoshihiko; and Noami, Tsuneo, to Rank Xerox, Ltd. Electrostatographic toner material. 4,175,962, Cl. 430-109.000.
Sailas, Vaino, to Valmet Oy. Roll and roll-manufacturing method. 4,176,270, Cl. 219-121.0EM.
Saini, Rakesh: *See—*
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., 4,176,106, Cl. 260-29.300.
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., 4,176,216, Cl. 521-106.000.
St. Jacques, Joseph A.: *See—*
Tachick, Henry N.; Arnold, Reginald S.; Belcher, James E.; and St. Jacques, Joseph A., 4,175,817, Cl. 339-111.000.
St. Louis Diecasting Corporation: *See—*
Bauman, Robert S., 4,175,724, Cl. 248-642.000.
Saito, Kazutoshi: *See—*
Kajimura, Takashi; Saito, Kazutoshi; Shige, Noriyuki; Nakamura, Michiharu; Umeda, Jun-ichi; and Kobayashi, Masayoshi, 4,176,325, Cl. 331-94.50H.
Sakai, Takahiro: *See—*
Sakakibara, Shumpei; Nagai, Yutaka; Fujiwara, Kenji; and Sakai, Takahiro, 4,176,009, Cl. 435-24.000.
Sakakibara, Shumpei; Nagai, Yutaka; Fujiwara, Kenji; and Sakai, Takahiro, to Ajinomoto Co., Inc. Method of measuring collagenase activity. 4,176,009, Cl. 435-24.000.
Sakamoto, Shinichi; and Sasayama, Takao, to Hitachi, Ltd. Electric ignition control system. 4,175,506, Cl. 123-117.00D.
Sakharnov, Vasily A.: *See—*
Kuchuk-Yatsenko, Sergei I.; Golomovzjuk, Ivan K.; Krivenko, Valery G.; Kulesh, Alexandr I.; Sakharnov, Vasily A.; Lazebny, Ivan L.; and Porkhun, Fedor K., 4,175,897, Cl. 409-300.000.
Sakulevich, Faddei J.; Minin, Leonid K.; Bazarnov, Jury A.; Baubel, Alexandr A.; and Skvorchevsky, Nikolai Y. Method for finishing surfaces of non-magnetic articles by means of ferromagnetic abrasive powder in magnetic field. 4,175,930, Cl. 51-281.00R.
Sakurada, Nobuaki; Ito, Tadashi; Shinoda, Nobuhiko; Ito, Fumio; Murakami, Hiroyashu; and Kawamura, Masaharu, to Canon Kabushiki Kaisha. Exposure control system for a camera. 4,175,842, Cl. 354-23.00D.
Sakurada, Nobuaki: *See—*
Murakami, Hiroyashu; Ito, Tadashi; Ito, Fumio; Sakurada, Nobuaki; Kawamura, Masaharu; and Shinoda, Nobuhiko, 4,175,848, Cl. 354-289.000.
Sakurada, Yutaka; Sunahara, Kimihisa; and Yamauchi, Kazuhisa, to Kuraray Co., Ltd.; and Kawasumi Laboratories, Inc. Semi-permeable membranes of regenerated cuprammonium cellulose and method for heat sterilization thereof in physiological saline. 4,176,070, Cl. 210-500.00M.
Sales Promotion Spits B.V.: *See—*
Cohen, Izak (Piet), 4,175,344, Cl. 40-364.000.
Salva, Juan M.: *See—*
Coupland, Keith; Salva, Juan M.; and Smith, Clinton R., 4,176,074, Cl. 252-32.70E.
Sammut, Nicholas. Dispensing containers. 4,175,680, Cl. 222-465.000.
Sanada, Masakatsu; Ito, Toshimitsu; and Nakada, Masahiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel supply system for engines. 4,175,527, Cl. 123-136.000.
Sanda, Shougo: *See—*
Noguchi, Masaaki; Sanda, Shougo; and Takizawa, Masaaki, 4,175,501, Cl. 123-30.00D.
Sandbank, Hans A., to GEC Medical Equipment Limited. Seal arrangement for a separating mechamism. 4,175,664, Cl. 209-657.000.
Santora, Norman J.: *See—*
Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., 4,176,198, Cl. 424-330.000.
Sarazen, Paul M., Jr.: *See—*
Beam, Dennis A., Jr.; and Sarazen, Paul M., Jr., 4,175,480, Cl. 98-37.000.

Sarkar, Kshitindra M.: *See*—
Ruscoe, Michael J. H.; Clegg, Maurice A.; Seibt, Willie H.; and Sarkar, Kshitindra M., 4,176,014, Cl. 204-23.000.
Saroy Engineering: *See*—
Husted, Royce H., 4,175,627, Cl. 180-190.000.
Sasaki, Makoto: *See*—
Tsuchiya, Shozo; Hayashi, Hideo; Sasaki, Makoto; Goto, Kiyoshi; and Ihida, Kazuyoshi, 4,176,146, Cl. 525-338.000.
Sasayama, Takao: *See*—
Sakamoto, Shinichi; and Sasayama, Takao, 4,175,506, Cl. 123-117.00D.
Satchell, David W.: *See*—
Redman, Michael J.; and Satchell, David W., 4,175,836, Cl. 350-357.000.
Sathe, Sharad S., to Mallinckrodt, Inc. Process for preparing p-aminophenol in the presence of dimethyldodecylamine sulfate. 4,176,138, Cl. 260-575.000.
Sato, Eiichi, to Olympus Optical Company Limited. Electrophotographic process using insulating dot overlayer. 4,175,957, Cl. 430-31.000.
Sato Gosei Co., Ltd.: *See*—
Suzuki, Tadashi, 4,176,151, Cl. 264-291.000.
Sato, Makoto: *See*—
Kishinami, Tateshi; and Sato, Makoto, 4,175,896, Cl. 408-230.000.
Sato, Yasushi: *See*—
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,175,851, Cl. 355-14.00R.
Satoh, Eiji: *See*—
Nagata, Yukio; Satoh, Eiji; and Tsuchida, Keinosuke, 4,175,461, Cl. 84-1.150.
Satou, Yoshihiko; and Teranishi, Katsuya, to Hitachi, Ltd. Escalator with step levelers. 4,175,652, Cl. 198-/332.000.
Sattelmeyer, Richard: *See*—
Teschner, Eckart; Riedel, Harald; and Sattelmeyer, Richard, 4,175,931, Cl. 51-297.000.
Savage, Richard T. Pet feeding device. 4,175,516, Cl. 119-62.000.
Sawaguchi, Hiroshi: *See*—
Ueda, Hideo; and Sawaguchi, Hiroshi, 4,176,134, Cl. 260-543.00R.
Scamehorn, John F.: *See*—
Bendig, Larry L.; Scamehorn, John F.; and Stowell, Donald E., 4,176,171, Cl. 423-628.000.
Scarpelli, Jonathan B. Apparatus for video display of audio frequency patterns. 4,176,375, Cl. 358-92.000.
Schaffer, William J.: *See*—
Froehlich, Frederick B.; Hennings, Roy; and Schaffer, William J., 4,176,382, Cl. 360-95.000.
Schaller, Herbert: *See*—
Schaller, Herta; and Schaller, Herbert, 4,175,786, Cl. 297-254.000.
Schaller, Herta; and Schaller, Herbert. Device for transporting children on chair lift seats. 4,175,786, Cl. 297-254.000.
Scharper S.p.A. Per l'Industria Farmaceutica: *See*—
Fazzini, Massimo, 4,176,129, Cl. 260-448.00R.
Schatz, Klaus W.: *See*—
McGovern, Stephen J.; Schatz, Klaus W.; and Zrinscak, Sr. Fred S., 4,176,083, Cl. 252-411.00R.
Schatzler, Walter; and Handler, Erich, to Webasto-Werk W. Baier GmbH & Co. Device for mounting the guide sleeve of a drive cable for a sliding top of an automobile roof. 4,175,784, Cl. 296-137.00E.
Schedele, Helmut; and von Tomkewitsch, Romuald, to Siemens Aktiengesellschaft. Fluid-tight protective system for an electromechanical component. 4,176,241, Cl. 174-52.00S.
Scheffler, Edward D., to Ag Superior, Inc. Harvesting apparatus and process. 4,175,368, Cl. 56-328.00R.
Scheier, Donald J.; Crawford, David R.; and McDonald, David M., to Simon-Johnson, Inc. Sealed feather picking unit. 4,175,302, Cl. 17-11.10R.
Scherer, Volker: *See*—
Schoettle, Klaus; Dobler, Peter; Gliniorz, Lothar; Scherer, Volker; and Brombach, Heinz, 4,175,999, Cl. 156-505.000.
Schering Aktiengesellschaft: *See*—
Annen, Klaus; Laurent, Henry; Hofmeister, Helmut; Wiechert, Rudolf; Wendt, Hans; and Kapp, Joachim-Friedrich, 4,176,126, Cl. 260-397.450.
Schering Corporation: *See*—
Neustadt, Bernard R.; and Zampaglione, Nicola, 4,176,120, Cl. 548-184.000.
Scheruebl, Franz. Ski structures. 4,175,767, Cl. 280-610.000.
Schimmel, Otto K., to Amba Marketing Systems, Inc. Attachment for motion translating machine. 4,175,329, Cl. 33-23.00R.
Schippers, Heinz; and Lenk, Erich, to Barmag Barmer Maschinenfabrik Ag. Chucking spindle for the reception of a bobbin carrier. 4,175,712, Cl. 242-46.400.
Schlaikjer, Carl R.: *See*—
Klinedinst, Keith A.; and Schlaikjer, Carl R., 4,176,214, Cl. 429-194.000.
Schlauch, Walter F.: *See*—
Caimi, Ronald J.; and Schlauch, Walter F., 4,176,108, Cl. 260-29.6TA.
Schlegel, Earl S., to Westinghouse Electric Corp. Thyristor fired by overvoltage. 4,176,371, Cl. 357-38.000.
Schmidhammer, Leonhard: *See*—
Zauhar, Helmut; Authier, Bernhard; Luptovits, Roland; and Schmidhammer, Leonhard, 4,175,610, Cl. 164-60.000.
Schmidt, Horst: *See*—
Leitz, Ludwig; Heitmann, Knut; Schneider, Eckart; and Schmidt, Horst, 4,175,365, Cl. 356-4.000.
Schmitt, Frederick L.: *See*—
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick L.; and Vock, Manfred H., 4,175,569, Cl. 131-9.000.
Schmoll, George F., III, to CBS Inc. Circuit for simulating string bass sound. 4,175,465, Cl. 84-1.260.
Schneider, Eckart: *See*—
Leitz, Ludwig; Heitmann, Knut; Schneider, Eckart; and Schmidt, Horst, 4,175,365, Cl. 356-4.000.
Schneider, Fritz W., to Elastogran Maschinenbau GmbH & Co. High pressure injection mixing head for multi-component plastics, particularly polyurethane. 4,175,874, Cl. 366-182.000.
Schneider, Horst: *See*—
Achelpohl, Fritz; and Schneider, Horst, 4,176,000, Cl. 156-510.000.
Schneider, John C.; Hanson, S. Eugene; and DuVall, Bruce W., to Kaman Sciences Corporation. Wet-wet differential pressure transducer. 4,175,443, Cl. 73-722.000.
Schnur, Rodney C., to Pfizer Inc. Spiro-quinolylhydantoins. 4,176,185, Cl. 424-258.000.
Schoettle, Klaus; Dobler, Peter; Gliniorz, Lothar; Scherer, Volker; and Brombach, Heinz, to BASF Aktiengesellschaft. Apparatus for loading magnetic tape cassettes with magnetic tape. 4,175,999, Cl. 156-505.000.
Scholl, Hans; and Tiemann, Helmut, to Koch Adler AG. Apparatus for marking and trimming collars. 4,175,681, Cl. 223-2.000.
Schopf, Hans-Joachim, to Daimler-Benz Aktiengesellschaft. Spline shaft connection. 4,175,404, Cl. 64-9.00R.
Schottel-Werft Josef Becker GmbH & Co. KG: *See*—
Krautkremer, Franz, 4,175,511, Cl. 115-35.000.
Schrader, Goetz, to Plaubel, Feinmechanik & Optik GmbH. Shutter-control mechanism for bellows camera. 4,175,847, Cl. 354-187.000.
Schranz, Karl-Wilhelm: *See*—
Credner, Hans-Heinrich; and Schranz, Karl-Wilhelm, 4,175,968, Cl. 430-559.000.
Schuette, William L.: *See*—
Winter, William E.; and Schuette, William L., 4,176,049, Cl. 208-70.000.
Schulz, Alfred; Kiencke, Uwe; and Honig, Gunther, to Robert Bosch GmbH. Stabilized voltage regulator circuit, particularly for use with a serially connected PNP transistor. 4,176,309, Cl. 323-4.000.
Schulz, Kurt: *See*—
Blaha, Erich; and Schulz, Kurt, 4,175,826, Cl. 350-36.000.
Muller, Ortwin; Grunvogel, Karl; and Schulz, Kurt, 4,175,839, Cl. 351-14.000.
Schwab, Frederick C., to Mobil Oil Corporation. Block copolymers. 4,176,144, Cl. 525-91.000.
Schwabe, Ulrich, to Siemens Aktiengesellschaft. Process for the production of a high frequency transistor. 4,175,983, Cl. 148-1.500.
Schwaiger, John E. Vehicle wheel engageable blocking device. 4,175,410, Cl. 70-226.000.
Schweizerische Lokomotiv-und Maschinenfabrik: *See*—
Moser, Peter, 4,175,494, Cl. 105-176.000.
Schwierz, Guenter: *See*—
Greschat, Walter; and Schwierz, Guenter, 4,176,280, Cl. 250-445.00T.
Schwierz, Gunter; and Haerer, Wolfgang, to Siemens Aktiengesellschaft. Tomograph for producing transverse layer images. 4,176,279, Cl. 250-445.00T.
SCI Systems, Inc.: *See*—
King, Olin B., 4,176,364, Cl. 346-162.000.
Scientific Energy Systems Corporation: *See*—
Gerstmann, Joseph, 4,175,706, Cl. 239-414.000.
Scott, Howard M., to RCA Corporation. Regulating television horizontal deflection arrangement. 4,176,304, Cl. 315-411.000.
Scott, Waller M., Jr.: *See*—
Goldblatt, Samuel; and Scott, Waller M., Jr., 4,175,546, Cl. 128-739.000.
Scragg, Robert L.; and Parker, Alfred B., to Solar Reactor Corporation. Electromagnetic reactor engine system-apparatus and method. 4,175,381, Cl. 60-39.120.
Scribner, Albert W. Semi-automatic stock feeder. 4,175,688, Cl. 226-158.000.
Seem, David M. Fruit dislodger for a harvesting machine. 4,175,621, Cl. 171-14.000.
Seibt, Willie H.: *See*—
Ruscoe, Michael J. H.; Clegg, Maurice A.; Seibt, Willie H.; and Sarkar, Kshitindra M., 4,176,014, Cl. 204-23.000.
Seidl, Jiri: *See*—
Ederer, Georg; Fischer, Adolf; Rosche, Paul; Troll, Helmar; Wurst, Wolfgang; Hengl, Helmut; and Seidl, Jiri, 4,175,504, Cl. 123-52.00M.
Seino, Kuniki; Kondo, Shoji; Tanaka, Susumu; and Sugiyama, Takashi, to Minolta Camera Kabushiki Kaisha. Electrophotographic processes using a pre-exposure. 4,175,955, Cl. 430-35.000.
Sempliner, Arthur T.: *See*—
Teague, Walter D., Jr.; and Sempliner, Arthur T., 4,175,299, Cl. 15-22.00R.
Teague, Walter D., Jr.; and Sempliner, Arthur T., 4,175,359, Cl. 51-170.0MT.
Seragnoli, Enzo, to G. D. Societa per Azioni. Feeding and cutting device for sheet material. 4,175,456, Cl. 83-176.000.
Seruga, Edward A.: *See*—
Bradham, Allen C., III; and Seruga, Edward A., 4,175,434, Cl. 73-197.000.

Service d'Exploitation Industrielle des Tabacs et des Allumettes: *See*— Battard, Jean-Claude; and Buisson, Jean, 4,175,996, Cl. 156-336.000.
Sevcik, Ladislav; Dvorak, Josef; and Mlynar, Jiri, to Elitex, Koncern textilniho strojirenstvi. Variable displacement pump. 4,175,474, Cl. 92-13.500.
Shaffer, John W.: *See*— Harvey, William J.; McDonough, Thomas B.; and Shaffer, John W., 4,176,389, Cl. 362-5.000.
Sharenson, Stanley: *See*— DeVita, Alphonse J.; Koester, Earl J.; Manoogian, David V.; and Sharenson, Stanley, 4,176,351, Cl. 343-9.00R.
Sharp, James H.: *See*— Loutfy, Rafik O.; McIntyre, Lloyd F.; and Sharp, James H., 4,175,981, Cl. 136-89.0SJ.
Loutfy, Rafik O.; Hsiao, Cheng-Kuo; and Sharp, James H., 4,175,982, Cl. 136-89.0SJ.
Sharp Kabushiki Kaisha: *See*— Yano, Kohzo; Inami, Yasuhiko; and Uede, Hisashi, 4,175,837, Cl. 350-357.000.
Shea, Frederick L., Jr., to Great Lakes Carbon Corporation. Method and apparatus for neutralizing the effect of accelerating and decelerating forces. 4,175,723, Cl. 244-162.000.
Sheets, Laurence L., to Bell Telephone Laboratories, Incorporated. System for identifying and correcting the polarity of a data signal. 4,176,248, Cl. 178-67.000.
Sheffield, Byford D.: *See*— Jernigan, Robert T.; and Sheffield, Byford D., 4,176,167, Cl. 423-476.000.
Shelton, J. Paul: *See*— Hsiao, James K.; and Shelton, J. Paul, 4,176,354, Cl. 343-17.700.
Shelton, Vernon E. Decimal timekeeping instrument. 4,175,378, Cl. 346-20.000.
Shen, Hwa J.: *See*— Davis, Billy J.; Kinsey, Cletus M.; Shen, Hwa J.; and Weber, James R., 4,175,799, Cl. 308-9.000.
Shenderovich, Pavel B.: *See*— Vulis, Mikhail L.; Golenchenko, Valery A.; Rybin, Igor V.; and Shenderovich, Pavel B., 4,176,238, Cl. 174-15.00S.
Shepard, John W.: *See*— Brown, Kenneth H.; and Shepard, John W., 4,176,328, Cl. 332-16.00T.
Sheridan, Catherine M.: *See*— Hartman, Seymour; and Sheridan, Catherine M., 4,176,115, Cl. 260-39.00R.
Sherritt Gordon Mines Limited: *See*— Ruscoe, Michael J. H.; Clegg, Maurice A.; Seibt, Willie H.; and Sarkar, Kshitindra M., 4,176,014, Cl. 204-23.000.
Shiber, Samuel. Hydromechanical transmission. 4,175,389, Cl. 60-414.000.
Shields, Michael P. Ski pole basket and carrying assembly. 4,175,683, Cl. 224-45.00S.
Shiga, Masaaki: *See*— Misumi, Teruyuki; Furuhashi, Susumu; and Shiga, Masaaki, 4,176,020, Cl. 204-72.000.
Shige, Noriyuki: *See*— Kajimura, Takashi; Saito, Kazutoshi; Shige, Noriyuki; Nakamura, Michiharu; Umeda, Jun-ichi; and Kobayashi, Masayoshi, 4,176,325, Cl. 331-94.50H.
Shih, Kun M.; and Walker, Derek, to Bristol-Myers Company. Chemical process. 4,176,131, Cl. 260-448.20E.
Shimada, Shinichi; and Makino, Takenori, to Honda Giken Kogyo Kabushiki Kaisha. Valve rotator assembly. 4,175,505, Cl. 123-90.300.
Shimizu, Akio: *See*— Inanaga, Kiyofumi; Egawa, Saburo; Shimizu, Akio; and Maeda, Keijiro, 4,176,249, Cl. 179-1.00E.
Shimp, David A., to Celanese Polymer Specialties Company. Soluble resinous products of polyepoxide-amine adducts and cyclic dicarboxylic acid anhydrides. 4,176,221, Cl. 528-103.000.
Shin-Etsu Chemical Co., Ltd.: *See*— Maekawa, Hideyuki; Noda, Kinzaburo; and Hoshi, Noboru, 4,176,175, Cl. 424-35.000.
Shin-Shirasuna Electric Corp.. *See*— Yamada, Toyohiko, 4,176,314, Cl. 324-140.00D.
Shinko Electric Co., Ltd.: *See*— Nakanishi, Sadao; Suzuki, Kazuhiro; Tokura, Nobufumi; and Endo, Shinichiro, 4,175,693, Cl. 235-463.000.
Shinoda, Nobuhiko: *See*— Murakami, Hiroyashu; Ito, Tadashi; Ito, Fumio; Sakurada, Nobuaki; Kawamura, Masaharu; and Shinoda, Nobuhiko, 4,175,848, Cl. 354-289.000.
Sakurada, Nobuaki; Ito, Tadashi; Shinoda, Nobuhiko; Ito, Fumio; Murakami, Hiroyashu; and Kawamura, Masaharu, 4,175,842, Cl. 354-23.00D.
Shinozaki, Fumiaki; Washigawa, Yasuo; Ikeda, Tomoaki; Nakao, Sho; and Kondoh, Syunichi, to Fuji Photo Film Co., Ltd. Light-sensitive photopolymerizable composition. 4,175,971, Cl. 430-287.000.
Shinshu Seiki Kabushiki Kaisha: *See*— Hanaoka, Seiji, 4,175,876, Cl. 400-124.000.
Shionogi & Co., Ltd.: *See*— Maekawa, Hideyuki; Noda, Kinzaburo; and Hoshi, Noboru, 4,176,175, Cl. 424-35.000.
Shoji, Masakazu: *See*— Saari, Veikko R.; and Shoji, Masakazu, 4,176,344, Cl. 340-347.0DA.
Shoketsu Kinzoku Kogyo Kabushiki Kaisha: *See*— Iizumi, Tomomitsu, 4,175,473, Cl. 91-443.000.
Shuck, David L.: *See*— Kube, Wolfram H.; and Shuck, David L., 4,175,789, Cl. 299-4.000.
Shuffield, Thomas E., Jr., to BEI Electronics, Inc. Signal translator with squelch. 4,176,286, Cl. 307-237.000.
Shupe, Russell D.: *See*— Wu, Ching H.; Brown, Alfred; Hall, Wilbur L.; and Shupe, Russell D., 4,175,618, Cl. 166-252.000.
Siegmund, Walter P., to American Optical Corporation. Method for making fiber optics fused arrays with improved blemish quality. 4,175,940, Cl. 65-4.00A.
Siemens Aktiengesellschaft: *See*— Cuno, Hans-Hellmuth, 4,176,305, Cl. 318-653.000.
Fruth, Albert; and Harenberg, Juergen, 4,176,256, Cl. 179-18.0FG.
Greschat, Walter; and Schwierz, Guenter, 4,176,280, Cl. 250-445.00T.
Manfreda, Alfred, 4,176,317, Cl. 325-62.000.
Pekau, Dietlind; Ruell, Hartwig; Storck, Eckhard; and Kiemle, Horst, 4,175,823, Cl. 350-3.790.
Schedele, Helmut; and von Tomkewitsch, Romuald, 4,176,241, Cl. 174-52.00S.
Schwabe, Ulrich, 4,175,983, Cl. 148-1.500.
Schwierz, Gunter; and Haerer, Wolfgang, 4,176,279, Cl. 250-445.00T.
Stoger, Klaus; Dotzer, Richard; Stadter, Josef; and Gehring, Johann, 4,176,034, Cl. 204-200.000.
Tischer, Peter; and Hundt, Eckart, 4,176,281, Cl. 250-492.00A.
Sigman, Warren R.; and Stalcup, Robert K., to United Technologies Corporation. Laser mirror with coolant fluid transfer manifold. 4,175,834, Cl. 350-310.000.
Sikli, Bert J., to Staines, Robert. Scissors lift. 4,175,644, Cl. 187-18.000.
Sill, Richard C.: *See*— Davis, Robert R.; Sill, Richard C.; and Yerkes, John W., 4,175,980, Cl. 136-89.0FC.
Silva, Vernon A.: *See*— Souza, Frank F.; Silva, Vernon A.; and Cabral, Tony, 4,175,514, Cl. 119-14.080.
SIMES Societa Italiana Medicinali e Sintetici S.p.A.: *See*— Ferrari, Giorgio; and Vecchietti, Vittorio, 4,176,182, Cl. 424-248.500.
Simo, Miroslav A., to New Archery Products Corp. Arrowhead body. 4,175,749, Cl. 273-106.50B.
Simon-Johnson, Inc.: *See*— Scheier, Donald J.; Crawford, David R.; and McDonald, David M., 4,175,302, Cl. 17-11.10R.
Simon, Jonathan C. System for selection and phase control of humbucking coils in guitar pickups. 4,175,462, Cl. 84-1.160.
Simon, Ned H.: *See*— Kovatch, George N.; Rosey, Richard; and Simon, Ned H., 4,176,243, Cl. 174-72.00B.
Simonidesz, Vilmos: *See*— Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.
Simons, Craig W.: *See*— Andersen, Charles E.; and Simons, Craig W., 4,175,815, Cl. 339-61.00R.
Simpson, Dennis D.: *See*— Cornell, Charles R.; and Simpson, Dennis D., 4,175,628, Cl. 180-6.480.
Sipple, Ralph E., to Sperry Rand Corporation. Apparatus for simultaneously measuring a plurality of digital events employing a random number table. 4,176,402, Cl. 364-900.000.
Skalla, Dale: *See*— Alsberg, Henry; Skalla, Dale; and Meisenhelder, William C., 4,176,104, Cl. 260-28.50R.
Skinner, David B., to GAF Corporation. Process for making urethane coated decorative sheet-type covering material. 4,176,210, Cl. 427-258.000.
Skogman, Richard A.: *See*— Moravec, Thomas J.; and Skogman, Richard A., 4,176,207, Cl. 427-160.000.
Moravec, Thomas J.; and Skogman, Richard A., 4,176,208, Cl. 427-160.000.
Skrentner, Frank C., to F. Jos. Lamb Company. Boring machine. 4,175,894, Cl. 408-1.00R.
Skvorchevsky, Nikolai Y.: *See*— Sakulevich, Faddei J.; Minin, Leonid K.; Bazarnov, Jury A.; Baubel, Alexandr A.; and Skvorchevsky, Nikolai Y., 4,175,930, Cl. 51-281.00R.
Sloan, Albert H. Gravitational flow separator of the multiple, apertured tube type for separating water from sand, gravel or the like. 4,176,066, Cl. 210-241.000.
Smith, Carolyn M.: *See*— Ponce, Phillip; and Kamon, John T., 4,175,679, Cl. 222-70.000.
Smith, Clinton R.: *See*— Coupland, Keith; Salva, Juan M.; and Smith, Clinton R., 4,176,074, Cl. 252-32.70E.
Smith, Gary L.: *See*— Johnson, Ralph W.; Burrs, Emil D.; Smith, Gary L.; Freund, Ronald G.; and Patula, Edward, 4,175,674, Cl. 221-88.000.
Smith, Joseph F.; and Smith, Joseph R., to PEM-IMS, Inc. Shaft coupling. 4,175,405, Cl. 64-10.000.
Smith, Joseph R.: *See*— Smith, Joseph F.; and Smith, Joseph R., 4,175,405, Cl. 64-10.000.

Smith, Robert G., to Kleen-Rite, Inc. Tank support assemblies. 4,175,666, Cl. 211-71.000.
Smith, Trevor S., to Lucas Industries Limited. Gas turbine engine fuel control system. 4,175,383, Cl. 60-39.28R.
Societe Anonyme des Etablissements Ph. Bonvillan & E. Ronceray: *See*—
Churlaud, Henri A., 4,175,869, Cl. 366-42.000.
s.a. Texaco Belgium n.v.: *See*—
Hermans, Johny C., 4,176,226, Cl. 528-332.000.
Societe de Prayon: *See*—
Pavonet, Engelhard, 4,176,160, Cl. 423-104.000.
Societe d'Etudes de Produits Chimiques: *See*—
Esanu, Andre, 4,176,193, Cl. 424-304.000.
Societe d'Etudes Scientifiques et Industrielles: *See*—
Barbier, Pierre, 4,176,180, Cl. 424-181.000.
Societe dite Coppertron S.A.: *See*—
Pedone, Antonio, 4,176,035, Cl. 204-205.000.
Societe Industrielle Bertrand Faure: *See*—
Letournoux, Alain; and Canals, Charles, 4,175,301, Cl. 16-146.000.
Societe Industrielle de Brevets et d'Etudes S.I.B.E.: *See*—
Mennesson, Andre L., 4,175,528, Cl. 123-139.0AW.
Societe Nationale Elf Aquitaine (Production): *See*—
Bimond, Jean-Pierre; and Lazarre, Flavien, 4,175,424, Cl. 73-49.200.
Societe Nationale Industrielle Aerospatiale: *See*—
Hoffmann, Jean-Claude; Castanie, Francis; Crabere, Henri; Verdier, Jean-Pierre; and Voisin, Norbert, 4,176,399, Cl. 364-717.000.
Sokolow, Nickolas N., to Beloit Corporation. Heating and stratification method for an injection molding machine. 4,176,152, Cl. 264-329.000.
Solar Reactor Corporation: *See*—
Scragg, Robert L.; and Parker, Alfred B., 4,175,381, Cl. 60-39.120.
Solid Photography Inc.: *See*—
DiMatteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., 4,175,862, Cl. 356-375.000.
Sommers, Donald J.: *See*—
DiTullio, Joseph G.; Parad, Leonard I.; and Sommers, Donald J., 4,176,330, Cl. 333-122.000.
Sonnenberger, Paul, to U.S. Philips Corporation. Circuit arrangement for supplying a protection signal for a television picture display tube. 4,176,301, Cl. 315-384.000.
Sony Corporation: *See*—
Inanaga, Kiyofumi; Egawa, Saburo; Shimizu, Akio; and Maeda, Keijiro, 4,176,249, Cl. 179-1.00E.
Inoue, Makoto, 4,176,206, Cl. 427-82.000.
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawana, Yoshiyuki, 4,176,372, Cl. 357-52.000.
Umeki, Nobutomo; and Sugiki, Mikio, 4,175,832, Cl. 350-285.000.
Southern, Raymond L.; and Reen, Orville W., to Allegheny Ludlum Industries, Inc. Apparatus for removing gases from particles. 4,175,921, Cl. 432-261.000.
Souza, Anthony J., to Woodstream Corporation. Padded jaw animal trap. 4,175,351, Cl. 43-90.000.
Souza, Frank F.; Silva, Vernon A.; and Cabral, Tony, to Frank F. Souza, Inc. Automatic milking machine control and cleansing. 4,175,514, Cl. 119-14.080.
Spanondis, Michael E.: *See*—
Cavalaris, Michael T.; and Spanondis, Michael E., 4,175,602, Cl. 150-3.000.
Speckman, Lawrence; and Beery, Jack, to Burroughs Corporation. Microfilm cassette module. 4,175,719, Cl. 242-197.000.
Spehrley, Charles W., Jr., to Xerox Corporation. Pneumatically controlled stapling system. 4,175,314, Cl. 29-432.100.
Speitkamp, Ludwig: *See*—
Regehr, Ulrich; Hannemann, Horst; and Speitkamp, Ludwig, 4,175,938, Cl. 55-440.000.
Sperry Rand Corporation: *See*—
Englund, Robert M., 4,176,247, Cl. 178-22.000.
Jillie, Don W., Jr., 4,176,029, Cl. 204-192.00S.
Kaminski, David G.; Fedde, Mickiel P.; and DeWard, Robert C., 4,176,394, Cl. 364-200.000.
Kroger, Harry, 4,176,365, Cl. 357-5.000.
McMahon, Donald H., 4,175,827, Cl. 350-96.140.
Nooyen, Ray E., 4,175,568, Cl. 130-27.00T.
Sippie, Ralph E., 4,176,402, Cl. 364-900.000.
Spindel, Robert C.; Porter, Robert P.; and Marquet, William M., to Woods Hole Oceanographic Institution. High resolution acoustic navigation system. 4,176,338, Cl. 367-6.00E.
Sprague, Robert B.: *See*—
Tyler, Truman V., 4,176,063, Cl. 210-101.000.
Spraycool, Inc.: *See*—
Valiant, Edgar W., 4,175,703, Cl. 239-208.000.
Sprecker, Mark A.: *See*—
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick L.; and Vock, Manfred H., 4,175,569, Cl. 131-9.000.
Spring Chemicals Limited: *See*—
Stark, William H.; and Chu, Cheng-Hsien, 4,176,164, Cl. 423-243.000.
Squyres, Joseph S.: *See*—
Nunez, Carl W.; and Squyres, Joseph S., 4,175,778, Cl. 285-3.000.
Stadler, Istvan: *See*—
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.
Stadter, Josef: *See*—
Stoger, Klaus; Dotzer, Richard; Stadter, Josef; and Gehring, Johann, 4,176,034, Cl. 204-200.000.
Stahlecker, Fritz, to Stahlecker, Hans; and Stahlecker, Fritz. Piecing apparatus for an open-end spinning machine. 4,175,370, Cl. 57-263.000.
Stahlecker, Hans: *See*—
Stahlecker, Fritz, 4,175,370, Cl. 57-263.000.
Staines, Robert: *See*—
Sikli, Bert J., 4,175,644, Cl. 187-18.000.
Stalcup, Robert K.: *See*—
Sigman, Warren R.; and Stalcup, Robert K., 4,175,834, Cl. 350-310.000.
Standard Oil Company: *See*—
Aziz, Walid Y.; and Ball, Lawrence E., 4,176,095, Cl. 260-9.000.
Grasselli, Robert K.; Miller, Arthur F.; and Hardman, Harley F., 4,176,234, Cl. 562-546.000.
Standard Oil Company (Indiana): *See*—
Corns, Joseph B.; Nevitt, Thomas D.; and Hertwig, Waldemar R., 4,176,048, Cl. 208-59.000.
Fox, Roy A.; and Mortimer, Bradford T., 4,176,097, Cl. 260-17.4BB.
Stapleton, John O.: *See*—
Johnson, Arven; and Stapleton, Willene, 4,176,346, Cl. 340-524.000.
Stapleton, Willene: *See*—
Johnson, Arven; and Stapleton, Willene, 4,176,346, Cl. 340-524.000.
Stark, William H.; and Chu, Cheng-Hsien, to Spring Chemicals Limited. Treatment of sulfur oxides with aqueous glyoxylic acid solutions. 4,176,164, Cl. 423-243.000.
Staubly, Ralph F.: *See*—
Engeling, Charles F.; and Staubly, Ralph F., 4,175,699, Cl. 237-55.000.
Stauffer Chemical Company: *See*—
Gutman, Arnold D., 4,176,121, Cl. 548-119.000.
Steffen, S. L.: *See*—
Steffen, Sylvester L.; and Bollwitt, Duaine L., 4,175,418, Cl. 73-342.000.
Steffen, Sylvester L.; and Bollwitt, Duaine L., to Steffen, S. L. Temperature monitoring and temperature differential control device. 4,175,418, Cl. 73-342.000.
Steinmeier, Albert. Shock-responsive activating device for emergency flasher systems of automative vehicles. 4,176,340, Cl. 340-52.00H.
Stenert, Alois: *See*—
Becker, Dieter; and Stenert, Alois, 4,175,805, Cl. 308-199.000.
Stephens, Warren J.; and Nielson, Juan F. Toilet bowl odor removing apparatus and hinge. 4,175,293, Cl. 4-209.00R.
Stern, Gernard: *See*—
Golser, Leopold; Czepel, Hubert; and Stern, Gernard, 4,176,217, Cl. 521-106.000.
Stern, Howard K.: *See*—
DiMatteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., 4,175,862, Cl. 356-375.000.
Stern, Nathan, to Bobst-Champlain, Inc. Method and apparatus for conservation of energy in a thermal oxidation system for use with a printing press. 4,176,162, Cl. 423-210.000.
Stevenson, Roberts G., Jr., to Fischer & Porter Co. Chlorine dioxide analyzer. 4,176,032, Cl. 204-195.00P.
Stewart, Patrick H.; and Woodson, Wayne D., to C L Industries, Inc. Process for manufacturing sand cores or molds. 4,176,114, Cl. 260-42.290.
Stihl, Andreas: *See*—
Muller, Erich; and Kottke, Joachim, 4,175,298, Cl. 7-138.000.
Stirling, John A.: *See*—
Robertson, George H.; and Stirling, John A., 4,175,979, Cl. 106-309.000.
Stockhaus, Klaus: *See*—
Goldberg, Leon I.; Merz, Herbert; and Stockhaus, Klaus, 4,176,186, Cl. 424-260.000.
Stockwell, David L.: *See*—
Poeschl, Paul M.; and Stockwell, David L., 4,175,677, Cl. 222-5.000.
Stoger, Klaus; Dotzer, Richard; Stadter, Josef; and Gehring, Johann, to Siemens Aktiengesellschaft. Apparatus for the electrodeposition of aluminum. 4,176,034, Cl. 204-200.000.
Stopka, Karel. Apparatus and method for treatment of fluid with ozone. 4,176,061, Cl. 210-63.00Z.
Storck, Eckhard: *See*—
Pekau, Dietlind; Ruell, Hartwig; Storck, Eckhard; and Kiemle, Horst, 4,175,823, Cl. 350-3.790.
Stoutamire, Donald W., to Sumitomo Chemical Company, Limited. Pesticidal α-cyanobenzyl ester enantiomer pair. 4,176,195, Cl. 424-304.000.
Stow-A-Way Trailers Limited: *See*—
Thackray, Ronald A., 4,175,768, Cl. 280-652.000.
Stowell, Donald E.: *See*—
Bendig, Larry L.; Scamehorn, John F.; and Stowell, Donald E., 4,176,171, Cl. 423-628.000.
Stoychoff, Terry A., to J. I. Case Company. Apparatus for felling and accumulating trees. 4,175,598, Cl. 144-34.00E.
Strunk, Harald. Winter sport device. 4,175,759, Cl. 280-16.000.
Sturtz, Georges; and Clement, Jean-Claude. Nylon polycondensate from diamino phosphonate. 4,176,225, Cl. 528-337.000.
Suddeutsche Kuhlerfabrik Julius Fr. Behr: *See*—
Pabst, Rolf; and Jenz, Siegfried, 4,175,616, Cl. 165-107.00D.

Sugardale Foods, Incorporated: *See*—
Vollmer, Arthur N.; and Rainey, George E., 4,176,199, Cl. 426-59.000.

Sugawara, Toru: *See*—
Komatsu, Isamu; Sugawara, Toru; and Yamauchi, Tsukasa, 4,176,288, Cl. 307-252.00A.

Sugiki, Mikio: *See*—
Umeki, Nobutomo; and Sugiki, Mikio, 4,175,832, Cl. 350-285.000.

Sugiyama, Takashi: *See*—
Seino, Kuniki; Kondo, Shoji; Tanaka, Susumu; and Sugiyama, Takashi, 4,175,955, Cl. 430-35.000.

Suh, Nam P.; Rotz, Christopher A.; and Erwin, Lewis, II, to Massachusetts Institute of Technology. Fluid mixing apparatus. 4,175,871, Cl. 366-79.000.

Sule, Sandor. Device for the braking of bicycles. 4,175,648, Cl. 188-344.000.

Sullivan, John D.: *See*—
Wojciehowski, James P.; and Sullivan, John D., 4,175,701, Cl. 239-11.000.

Sumitomo Bakelite Company Limited: *See*—
Miki, Kyosuke; and Takeuchi, Masahiro, 4,176,154, Cl. 264-547.000.

Sumitomo Chemical Company, Limited: *See*—
Itaya, Nobushige; and Hirano, Masachika, 4,176,189, Cl. 424-273.00R.
Stoutamire, Donald W., 4,176,195, Cl. 424-304.000.

Sumiyoshi, Masaharu: *See*—
Noguchi, Masaaki; Sumiyoshi, Masaharu; Bunda, Tsuchio; and Tanaka, Taro, 4,175,523, Cl. 123-119.00A.

Summerfelt, Conrad G. Edger fan apparatus. 4,175,622, Cl. 172-14.000.

Sun Oil Company (Delaware): *See*—
Braun, Clarence; and Zupanick, Joseph E., 4,175,423, Cl. 73-30.000.

Sunahara, Kimihisa: *See*—
Sakurada, Yutaka; Sunahara, Kimihisa; and Yamauchi, Kazuhisa, 4,176,070, Cl. 210-500.00M.

Sundstrand Corporation: *See*—
Linscott, Phillip S., Jr., 4,176,242, Cl. 174-52.00H.

Sunnarborg, Earl D. Miniature electrical voltage and continuity tester with circuit compartment and test lead compartment casing. 4,176,315, Cl. 324-156.000.

Surbey, Donald L.; Clark, Alan C.; and Miller, Leonard E., to Lubrizol Corporation, The. Solutions of acrylamidoalkanesulfonic acid salts in organic liquids and method for their preparation. 4,176,081, Cl. 252-182.000.

Sury, Yel S.; and Guillory, Melvin J., Jr., to Ciba-Geigy Corporation. Process for soluble cyanide removal from wastewater streams. 4,176,060, Cl. 210-62.000.

Suter, Otto (Bo), Jr.: *See*—
Moser, Billy G.; and Suter, Otto (Bo), Jr., 4,175,658, Cl. 206-221.000.

Sutton, Richard C.: *See*—
Figueras, John; Nelson, Roger W.; and Sutton, Richard C., 4,176,008, Cl. 435-12.000.

Suzuki, Fred K.; and Davison, Thomas W., to Liquid Crystal Products, Inc. Venipuncture method. 4,175,543, Cl. 128-736.000.

Suzuki, Fumiko, to Quatic Chemicals Limited. Anti-corrosion composition for use in aqueous systems. 4,176,059, Cl. 210-58.000.

Suzuki, Isao; Yomogida, Toshihiko; and Yokota, Tsuyoshi, to Toyoda-Koki Kabushiki-Kaisha. Programmable sequence controller. 4,176,403, Cl. 364-900.000.

Suzuki, Isao: *See*—
Miyamoto, Kazuo; Suzuki, Isao; and Koide, Hideo, 4,175,373, Cl. 58-16.00D.

Suzuki, Kazuhiro: *See*—
Nakanishi, Sadao; Suzuki, Kazuhiro; Tokura, Nobufumi; and Endo, Shinichiro, 4,175,693, Cl. 235-463.000.

Suzuki, Masahiro: *See*—
Matsuura, Mitsuaki; Hidano, Tsuyoshi; and Suzuki, Masahiro, 4,175,318, Cl. 29-723.000.

Suzuki, Masami: *See*—
Inaba, Hideya; Ogiyama, Hisao; Ichiki, Masayoshi; Kamino, Yasumi; Matsumoto, Nobuo; Nagai, Kenichi; and Suzuki, Masami, 4,176,091, Cl. 252-456.000.

Suzuki, Nobuo, to Technical Incorporated. Tape machine having automatic return to playback mode after fast forward or rewind. 4,176,383, Cl. 360-105.000.

Suzuki, Ryuichi: *See*—
Hashizume, Akihide; Suzuki, Ryuichi; Yokouchi, Hisatake; Horiuchi, Hideyuki; and Yamamoto, Shinji, 4,175,859, Cl. 356-39.000.

Suzuki, Tadashi, to Sato Gosei Co., Ltd. Method for manufacturing an article stopper device. 4,176,151, Cl. 264-291.000.

Svenskt Stal Aktiebolag: *See*—
Karlsson, Per-Olle, 4,175,729, Cl. 266-51.000.

Swanson, Gerald T., to Teledyne Industries, Inc. Cigarette filters. 4,175,571, Cl. 131-171.00A.

Swarthout, David J.: *See*—
Karam, Ronald E.; and Swarthout, David J., 4,175,959, Cl. 430-134.000.

Swinland, Horace J.: *See*—
Coil, Donald A.; Johnson, John L., Jr.; and Swinland, Horace J., 4,175,801, Cl. 308-23.000.

Szantay, Csaba: *See*—
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.

Szegho, Constantin S.: *See*—
Pakswer, Serge; and Szegho, Constantin S., 4,175,808, Cl. 316-19.000.

Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, to Chinoin Gyogyszer es Vegyeszeti Termekek. Process for the preparation of bicyclic enone compounds. 4,176,122, Cl. 260-343.30P.

Tabata, Yoichi, to Itoki Kosakusho Co., Ltd. Automatic commodity storing apparatus. 4,175,901, Cl. 414-282.000.

Tachick, Henry N.; Arnold, Reginald S.; Belcher, James E.; and St. Jacques, Joseph A., to General Electric Company. Electrical connector switching module. 4,175,817, Cl. 339-111.000.

Tadanier, John S.: *See*—
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,176,178, Cl. 424-180.000.

Takahashi, Akira: *See*—
Nozawa, Shiyozo; Hokari, Saburo; Yamaga, Shigeru; and Takahashi, Akira, 4,175,846, Cl. 354-173.000.

Takahashi, Masao: *See*—
Hattori, Katsuhide; and Takahashi, Masao, 4,175,990, Cl. 149-21.000.

Takase, Tsuneo, to Tokyo Shibaura Electric Co., Ltd. Electronic watch having improved level setting circuit. 4,175,375, Cl. 58-23.00R.

Takata, Akira: *See*—
Hattori, Tadashi; Takata, Akira; Fukuda, Tamotsu; and Nakase, Takamichi, 4,175,521, Cl. 123-119.00D.

Takeuchi, Masahiro: *See*—
Miki, Kyosuke; and Takeuchi, Masahiro, 4,176,154, Cl. 264-547.000.

Takimoto, Hiroyuki: *See*—
Iwashita, Tomonori; Takimoto, Hiroyuki; Mashimo, Yukio; and Hashimoto, Teiji, 4,175,845, Cl. 354-173.000.

Takinishi, Kiyotoshi; and Hattori, Junichi, to Rion Co., Ltd. Artificial palate for use in dynamic palatographical speech researches and improvements and method of fabricating the same. 4,175,338, Cl. 35-35.00R.

Takizawa, Masaaki: *See*—
Noguchi, Masaaki; Sanda, Shougo; and Takizawa, Masaaki, 4,175,501, Cl. 123-30.00D.

Talbot, Yorck. Electrically controllable outer rearview mirror for vehicles. 4,175,833, Cl. 350-289.000.

Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Ohno, Hideshi; and Natori, Minoru, to Citizen Watch Co. Ltd. Electronic timepiece. 4,175,372, Cl. 58-5.000.

Tamm, Rolf G.; Grosser, Gunter; and Tomoff, Toma, to Bodenseewerk Perkin-Elmer & Co. GmbH. Graphite tube atomizer for flameless atomic absorption spectroscopy. 4,175,863, Cl. 356-312.000.

Tanahashi, Toshio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine with an auxiliary combustion chamber. 4,175,531, Cl. 123-191.00S.

Tanaka, Fumiaki: *See*—
Kawabe, Naoshi; Kaji, Hisatsugu; Miwa, Naotaka; Nakanishi, Hajime; Tanaka, Fumiaki; and Inoue, Tatsuya, 4,175,708, Cl. 241-16.000.

Tanaka, Kiyomitsu: *See*—
Kumode, Masami, 4,175,361, Cl. 52-66.000.

Tanaka, Susumu: *See*—
Seino, Kuniki; Kondo, Shoji; Tanaka, Susumu; and Sugiyama, Takashi, 4,175,955, Cl. 430-35.000.

Tanaka, Taro: *See*—
Noguchi, Masaaki; Sumiyoshi, Masaharu; Bunda, Tsuchio; and Tanaka, Taro, 4,175,523, Cl. 123-119.00A.

Taneda, Nobuo: *See*—
Asanuma, Akira; Taneda, Nobuo; Hasegawa, Ryozo; Jindai, Shohei; and Morishita, Toshio, 4,176,156, Cl. 422-25.000.

Taniuchi, Mamoru: *See*—
Mori, Kenji; Taniuchi, Mamoru; and Yaguchi, Shigeo, 4,176,041, Cl. 208-10.000.

Tann, David, to Electro-Mechanical Products. Linear programmer for an actuator. 4,176,264, Cl. 200-82.00E.

Tao, Fan-Sheng; and Warner, John E., to Texaco Inc. Method of assembling a settling tank. 4,175,312, Cl. 29-428.000.

Tatum, James R.; and Dayus, Barry R. Latch plate. 4,175,607, Cl. 160-1.000.

Taylor, Clifford G.: *See*—
Corfield, John R.; and Taylor, Clifford G., 4,176,231, Cl. 544-16.000.

Taylor, Gordon J. Radius rod or rocker arm bushes. 4,175,806, Cl. 308-238.000.

Taylor, Reginald S., to Taylor Woodrow Construction Limited. Joints for anchoring structures to the sea bed. 4,175,890, Cl. 405-202.000.

Taylor, Robert M.: *See*—
Buckman, John D.; Hunter, Wood E.; Pera, John D.; and Taylor, Robert M., 4,176,107, Cl. 260-29.60E.

Taylor Woodrow Construction Limited: *See*—
Taylor, Reginald S., 4,175,890, Cl. 405-202.000.

Teague, Walter D., Jr.; and Sempliner, Arthur T. Power toothbrush or the like with orbital brush action. 4,175,299, Cl. 15-22.00R.

Teague, Walter D., Jr.; and Sempliner, Arthur T. Fluid powered orbital wet sander and the like. 4,175,359, Cl. 51-170.0MT.

Technical Incorporated: *See*—
Suzuki, Nobuo, 4,176,383, Cl. 360-105.000.

Technisch Handels- en Adviesbureau van Geffen B.V.: *See*—
van Geffen, Johannes A., 4,175,413, Cl. 72-71.000.
Tega, Ezio. Machine for making decorative chains having links of at least two different shapes or sizes. 4,175,379, Cl. 59-16.000.
Teijin Limited: *See*—
Asanuma, Akira; Taneda, Nobuo; Hasegawa, Ryozo; Jindai, Shohei; and Morishita, Toshio, 4,176,156, Cl. 422-25.000.
Tekram Associates, Inc.: *See*—
Brosenius, Karl H., 4,175,698, Cl. 237-19.000.
Telcom, Inc.: *See*—
Tuttle, Lauren P.; and Dluehosh, Paul H., 4,176,254, Cl. 179-5.00R.
Teledyne Industries, Inc.: *See*—
Swanson, Gerald T., 4,175,571, Cl. 131-171.00A.
Teleflex Incorporated: *See*—
Bennett, William G., 4,175,450, Cl. 74-501.00P.
Teletype Corporation: *See*—
Heckel, George, 4,176,400, Cl. 364-900.000.
Randolph, John E., 4,175,877, Cl. 400-196.000.
Tell, Benjamin: *See*—
Kasper, Horst M.; Tell, Benjamin; and Wagner, Sigurd, 4,176,170, Cl. 423-508.000.
Templeton, John S., III, to Exxon Production Research Company. Pressure sensing apparatus. 4,175,445, Cl. 73-768.000.
Tencor Instruments: *See*—
Urbanek, Karel; Kren, George J.; and Wheeler, William R., 4,175,441, Cl. 73-599.000.
Teradyne, Inc.: *See*—
Hunter, Bradley L., 4,175,821, Cl. 339-258.00R.
Wrinn, Joseph F., 4,176,312, Cl. 324-57.00N.
Wrinn, Joseph F., 4,176,313, Cl. 324-62.000.
Terai, Kiyohide; and Kutsuna, Muneharu, to Kawasaki Jukogyo Kabushiki Kaisha. Method for performing electron beam welding. 4,176,271, Cl. 219-121.0EM.
Teranishi, Katsuya: *See*—
Satou, Yoshihiko; and Teranishi, Katsuya, 4,175,652, Cl. 198-/332.000.
Termanini, Zafer A., to Zafmedico Corp. Method and apparatus for fiber-optic cardiovascular endoscopy. 4,175,545, Cl. 128-666.000.
Terminal Data Corporation: *See*—
Turner, William C.; Limburg, William R.; and Burton, John S., 4,175,855, Cl. 355-68.000.
Ternan, Marten; and Parsons, Basil I., to Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources. Process for catalytically hydrocracking a heavy hydrocarbon oil. 4,176,051, Cl. 208-112.000.
Terry, Hazle B., to United States Steel Corporation. Method and apparatus for the ultrasonic detection of flaws in hot metallic objects. 4,175,442, Cl. 73-627.000.
Teschner, Eckart; Riedel, Harald; and Sattelmeyer, Richard, to Hoechst Aktiengesellschaft. Abrasive material and process for manufacturing the same. 4,175,931, Cl. 51-297.000.
Texaco Inc.: *See*—
Johnson, Everett M., 4,175,331, Cl. 33-172.00E.
Tao, Fan-Sheng; and Warner, John E., 4,175,312, Cl. 29-428.000.
Wu, Ching H.; Brown, Alfred; Hall, Wilbur L.; and Shupe, Russell D., 4,175,618, Cl. 166-252.000.
Texas Instruments Incorporated: *See*—
Dimyan, Magid Y.; Hubbell, Wayne C.; Chang, Christopher T. M.; and Linn, John C., 4,176,404, Cl. 365-12.000.
Textron Inc.: *See*—
Moertel, George B., 4,176,149, Cl. 264-146.000.
Thacker, George H.: *See*—
Ritland, Harold N.; and Thacker, George H., 4,175,469, Cl. 89-1.00B.
Thackray, Ronald A., to Stow-A-Way Trailers Limited. Collapsible trailers. 4,175,768, Cl. 280-652.000.
Thieme, Werner: *See*—
Knoll, Ernst, 4,175,560, Cl. 128-269.000.
Thiokol Corporation: *See*—
Bell, Frank H., 4,175,470, Cl. 89-7.000.
Thistle, William G.; and Dionne, Joseph G. G., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Ultra violet initiated gas discharge visual display matrix. 4,176,297, Cl. 315-150.000.
Thomanek, Franz R., to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Warhead and anti-tank missile construction. 4,175,491, Cl. 102-56.0SC.
Thomas, James. Anti-theft device for internal combustion engine of a motor vehicle. 4,175,635, Cl. 180-287.000.
Thomas, Richard R.: *See*—
United States of America, National Aeronautics and Space Administration; Jeffers, Eldon L.; and Thomas, Richard R., 4,176,007, Cl. 435-34.000.
Thomson-Brandt: *See*—
Bricot, Claude; Dubois, Jean-Claude; LeCarvennec, Francois; Lehureau, Jean-Claude; and Magna, Henriette, 4,176,277, Cl. 250-316.100.
Thomson-CSF: *See*—
Delagebeaudeuf, Daniel, 4,176,366, Cl. 357-16.000.
Micheron, Francois; and Bruneel, Jean-Luc, 4,176,345, Cl. 340-373.000.
Thornton, William A., Jr., to Westinghouse Electric Corp. Method and device for efficiently generating white light with good rendition of illuminated objects. 4,176,294, Cl. 313-485.000.
Thornton, William A., Jr., to Westinghouse Electric Corp. Method for efficiently generating white light with good color rendition of illuminated objects. 4,176,299, Cl. 315-326.000.
Thurmond, Gary D.: *See*—
Forward, Robert L.; and Thurmond, Gary D., 4,176,331, Cl. 333-213.000.
Tiee, Joe J.: *See*—
Wittig, Curt; and Tiee, Joe J., 4,176,326, Cl. 331-94.50G.
Tiefenbacher, Eberhard, to Daimler-Benz Aktiengesellschaft. Radial turbine wheel for a gas turbine. 4,175,911, Cl. 416-183.000.
Tieke, Otto: *See*—
Dudek, Max; and Tieke, Otto, 4,176,010, Cl. 201-27.000.
Tiemann, Helmut: *See*—
Scholl, Hans; and Tiemann, Helmut, 4,175,681, Cl. 223-2.000.
Tillinghast, William S.: *See*—
Nolan, Clyde E., Jr.; and Tillinghast, William S., 4,175,620, Cl. 166-343.000.
Tipler, Earl L.: *See*—
Chaffee, David H.; and Tipler, Earl L., 4,175,800, Cl. 308-9.000.
Tippmer, Kurt: *See*—
Husher, Lee K.; Weber, Heinrich; and Tippmer, Kurt, 4,176,062, Cl. 210-72.000.
Tipton, Robert R. Lifting device. 4,175,899, Cl. 414-11.000.
Tischer, Peter; and Hundt, Eckart, to Siemens Aktiengesellschaft. Method for adjusting a semiconductor disk relative to a radiation mask in x-ray photolithography. 4,176,281, Cl. 250-492.00A.
Tobey, Frederic S. Food smoking. 4,175,484, Cl. 99-482.000.
Tobin, Joseph J.; Robinson, David B.; Peay, Robert L.; Powell, Jerry R.; and Gay, Leslie W., to Coded Communications. Electronic security device. 4,176,348, Cl. 340-562.000.
Toda, Minoru; Osaka, Susumu; and Matsumoto, Yasushi, to RCA Corporation. Signal pickup arm lifting/lowering and groove skipper apparatus. 4,176,378, Cl. 358-128.000.
Todokoro, Masatoshi. Game board. 4,175,742, Cl. 273-1.00R.
Togashi, Akira. Gathering the ends of heat-conducting pipes in heat exchangers. 4,175,308, Cl. 29-157.30C.
Tokiwa, Taisuke: *See*—
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,175,851, Cl. 355-14.00R.
Tokura, Nobufumi: *See*—
Nakanishi, Sadao; Suzuki, Kazuhiro; Tokura, Nobufumi; and Endo, Shinichiro, 4,175,693, Cl. 235-463.000.
Tokyo Shibaura Electric Co., Ltd.: *See*—
Aoki, Kiyoshi; and Kamo, Hisao, 4,175,317, Cl. 29-571.000.
Takase, Tsuneo, 4,175,375, Cl. 58-23.00R.
Uematsu, Yutaka, 4,176,367, Cl. 357-19.000.
Tolley, William K., to UOP Inc. Recovery of iron and titanium metal values. 4,175,952, Cl. 75-101.00R.
Tomeo, Anthony: *See*—
McMillen, James W.; and Tomeo, Anthony, 4,176,262, Cl. 200-50.0AA.
Tomoff, Toma: *See*—
Tamm, Rolf G.; Grosser, Gunter; and Tomoff, Toma, 4,175,863, Cl. 356-312.000.
Tomoskozi, Istvan: *See*—
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.
Tonges, Gerald A.; and Elmlinger, Eugene L., to American Standard Inc. Non-copying printed document and method of printing same. 4,175,774, Cl. 283-6.000.
Toppan Printing Co., Ltd.: *See*—
Naganuma, Tsutomu; Hoshi, Hisao; Kumagai, Hiroji; and Yoshida, Kaneki, 4,175,958, Cl. 430-49.000.
Toshiba Tungaloy Co., Ltd.: *See*—
Kishinami, Tateshi; and Sato, Makoto, 4,175,896, Cl. 408-230.000.
Total Systems, Inc.: *See*—
Johnson, Ralph W.; Burrs, Emil D.; Smith, Gary L.; Freund, Ronald G.; and Patula, Edward, 4,175,674, Cl. 221-88.000.
Toth, John F.: *See*—
Fassett, Matthew; Pizette, Seymour B.; and Toth, John F., 4,176,359, Cl. 343-854.000.
Towmotor Corporation: *See*—
Palmer, Norman H. G., 4,176,388, Cl. 361-196.000.
Toyo Ink Manufacturing Co., Ltd.: *See*—
Tsuchiya, Shozo; Hayashi, Hideo; Sasaki, Makoto; Goto, Kiyoshi; and Ihida, Kazuyoshi, 4,176,146, Cl. 525-338.000.
Toyoda-Koki Kabushiki-Kaisha: *See*—
Suzuki, Isao; Yomogida, Toshihiko; and Yokota, Tsuyoshi, 4,176,403, Cl. 364-900.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Goto, Kenji; Yokota, Masato; and Kobayashi, Hideo, 4,175,533, Cl. 123-191.00S.
Hattori, Tadashi; Takata, Akira; Fukuda, Tamotsu; and Nakase, Takamichi, 4,175,521, Cl. 123-119.00D.
Katahira, Eturou; Yamaguchi, Shunzo; Kida, Masashi; and Ishida, Yasuhiko, 4,175,386, Cl. 60-276.000.
Kato, Takashi, 4,175,532, Cl. 123-191.00S.
Nogami, Tomoyuki, 4,175,791, Cl. 303-24.00A.
Noguchi, Masaaki; Sanda, Shougo; and Takizawa, Masaaki, 4,175,501, Cl. 123-30.00D.
Sanada, Masakatsu; Ito, Toshimitsu; and Nakada, Masahiko, 4,175,527, Cl. 123-136.000.

Tanahashi, Toshio, 4,175,531, Cl. 123-191.00S.

Transcale A.B.: *See—*
Odlen, Lars; and Hansson, Anders, 4,176,251, Cl. 179-1.0SW.

Trefilunion: *See—*
Bernot, Jean, 4,175,412, Cl. 72-40.000.

Tresch, Erwin: *See—*
Horvath, Zoltan; and Tresch, Erwin, 4,175,865, Cl. 356-338.000.

Triomf Fertilizers: *See—*
Jordaan, Pieter J.; and van Deventer, Jacobus P., 4,175,943, Cl. 71-29.000.

Tripler, John G., to American Fiber Velope Manufacturing Co. Expansible gusset envelope and method and apparatus for fabricating same. 4,175,478, Cl. 93-62.000.

Troll, Helmar: *See—*
Ederer, Georg; Fischer, Adolf; Rosche, Paul; Troll, Helmar; Wurst, Wolfgang; Hengl, Helmut; and Seidl, Jiri, 4,175,504, Cl. 123-52.00M.

Trutzschler GmbH & Co. KG: *See—*
Vollrath, Ulrich; and Leifeld, Ferdinand, 4,175,893, Cl. 406-52.000.

TRW Inc.: *See—*
Bianchi, Maurice P.; and Rosales, Louis A., 4,175,642, Cl. 184-1.00E.
Ewalt, Leonard J.; and Kaushal, Som N., 4,175,986, Cl. 148-16.500.

Tsubai, Yasuo: *See—*
Yoshida, Akio; Tsubai, Yasuo; and Ebato, Seigo, 4,175,965, Cl. 430-230.000.

Tsuchida, Keinosuke: *See—*
Nagata, Yukio; Satoh, Eiji; and Tsuchida, Keinosuke, 4,175,461, Cl. 84-1.150.

Tsuchiya, Shozo; Hayashi, Hideo; Sasaki, Makoto; Goto, Kiyoshi; and Ihida, Kazuyoshi, to Nippon Oil Co., Ltd.; and Toyo Ink Manufacturing Co., Ltd. Process for producing curable coating resins. 4,176,146, Cl. 525-338.000.

Tummel, Harold. Fluid-jet drill. 4,175,626, Cl. 175-422.000.

Tureaud, Kenneth E., to Warner-Lambert Company. Complete denture prostheses and method of fitting. 4,175,322, Cl. 433-171.000.

Turner, Ronald L.: *See—*
Kindig, James K.; and Turner, Ronald L., 4,175,924, Cl. 44-15.00R.

Turner, William C.; Limburg, William R.; and Burton, John S., to Terminal Data Corporation. Electronic exposure control. 4,175,855, Cl. 355-68.000.

Tuttle, Lauren P.; and Dluehosh, Paul H., to Telcom, Inc. Emergency roadside telephone system. 4,176,254, Cl. 179-5.00R.

Tyler, Ronald A., to Marconi Company Limited, The. Apparatus for deriving information concerning the movements of a vehicle. 4,176,352, Cl. 343-9.00R.

Tyler, Truman V., to Beall, Richard W., Jr.; Sprague, Robert B.; Favara, Louis J.; and Gausewitz, Carr & Rothenberg, part interest to each. Water purifier system and valve. 4,176,063, Cl. 210-101.000.

Uchida, Toshio; Yabuta, Yorimiti; and Ikeda, Teppei, to Fuji Photo Film Co., Ltd. Method of making a lithographic printing plate. 4,175,964, Cl. 430-253.000.

Ueda, Hideo; and Sawaguchi, Hiroshi, to Fuji Photo Film Co., Ltd. Aromatic sulfonamide sulfonyl chloride compounds. 4,176,134, Cl. 260-543.00R.

Ueda, Ryoji: *See—*
Kasai, Kaname; Mukumoto, Takaji; Asakura, Toshikazu; and Ueda, Ryoji, 4,175,408, Cl. 64-26.000.

Uede, Hisashi: *See—*
Yano, Kohzo; Inami, Yasuhiko; and Uede, Hisashi, 4,175,837, Cl. 350-357.000.

Uematsu, Yutaka, to Tokyo Shibaura Electric Co., Ltd. Semiconductor optical device. 4,176,367, Cl. 357-19.000.

Umeda, Jun-ichi: *See—*
Kajimura, Takashi; Saito, Kazutoshi; Shige, Noriyuki; Nakamura, Michiharu; Umeda, Jun-ichi; and Kobayashi, Masayoshi, 4,176,325, Cl. 331-94.50H.

Umeki, Nobutomo; and Sugiki, Mikio, to Sony Corporation. Two-axis mirror control apparatus. 4,175,832, Cl. 350-285.000.

Union Carbide Corporation: *See—*
Holcombe, Thomas C., 4,176,053, Cl. 208-310.00Z.
McDonald, James A.; and Novak, Mark C., 4,175,673, Cl. 221-63.000.
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., 4,176,106, Cl. 260-29.300.
Reid, Wallace G.; Saini, Rakesh; and Atkins, Kenneth E., 4,176,216, Cl. 521-106.000.

Union Special Corporation: *See—*
Navlyt, Gerald S., 4,175,499, Cl. 112-165.000.

United States of America
Air Force: *See—*
Kuhn, Ralph F., Jr., 4,175,835, Cl. 350-310.000.
Palmer, Arlo K., 4,175,812, Cl. 339-29.00R.
Ritland, Harold N.; and Thacker, George H., 4,175,469, Cl. 89-1.00B.
Army: *See—*
Cronin, Donald L.; and Biess, John J., 4,176,392, Cl. 363-71.000.
Rybicki, Robert C., 4,175,913, Cl. 416-244.00R.
Energy: *See—*
Frumerman, Robert; and Hooper, Harold M., 4,175,929, Cl. 48-202.000.
Norris, Neil J., 4,176,285, Cl. 307-106.000.
Oden, Laurance L.; and Russell, James H., 4,175,954, Cl. 75-138.000.
Wittig, Curt; and Tiee, Joe J., 4,176,326, Cl. 331-94.50G.

National Aeronautics and Space Administration; administrator; with respect to an invention of:
Jeffers, Eldon L.; and Thomas, Richard R. Method and apparatus for eliminating luminol interference material. 4,176,007, Cl. 435-34.000.

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Leavy, William A.; and Griffin, Charles R., 4,176,360, Cl. 343-883.000.

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Craig, W. Dale, 4,175,720, Cl. 244-3.280.
Hazlett, Robert N., 4,176,040, Cl. 208-8.0LE.
Hsiao, James K.; and Shelton, J. Paul, 4,176,354, Cl. 343-17.700.
Konrad, William L., 4,176,339, Cl. 367-121.000.
Wilger, John F.; Nakano, Gregory S.; Uyetake, Tadao; Orillo, Stephen, Jr.; and Higa, Teikichi, 4,175,471, Cl. 408-83.500.

U.S. Philips Corporation: *See—*
de Niet, Edmond; and Rijckaert, Albert M. A., 4,176,381, Cl. 360-77.000.
Elenga, Cornelis W.; van Dijk, Pieter; and van der Zwart, Alfred J., 4,176,310, Cl. 323-7.000.
Koel, Gerrit J.; and Postma, Lambertus, 4,176,016, Cl. 204-38.00R.
Sonnenberger, Paul, 4,176,301, Cl. 315-384.000.
Van Den Berk, Peter J. T.; and Verspui, Gerrit, 4,176,336, Cl. 338-274.000.

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Husher, Lee K.; Weber, Heinrich; and Tippmer, Kurt, 4,176,062, Cl. 210-72.000.
Terry, Hazle B., 4,175,442, Cl. 73-627.000.
Wiesboeck, Robert A., 4,175,394, Cl. 62-51.000.

United Technologies Corporation: *See—*
Sigman, Warren R.; and Stalcup, Robert K., 4,175,834, Cl. 350-310.000.
Waehner, Glenn C., 4,176,300, Cl. 315-371.000.
Wayne, Robert J.; Chenausky, Peter P.; and Buczek, Carl J., 4,176,327, Cl. 331-94.50M.

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Crowninshield, Roy D.; and Branch, Andrew J., 4,175,446, Cl. 73-787.000.

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Gainer, John L., 4,176,179, Cl. 424-180.000.

Unruh, Dennis R.; and Martin, Robert J., to Cessna Aircraft Company, The. Hydraulic stop. 4,175,914, Cl. 417-218.000.

UOP Inc.: *See—*
Antos, George J., 4,176,088, Cl. 252-441.000.
Tolley, William K., 4,175,952, Cl. 75-101.00R.

Upjohn Company, The: *See—*
Bundy, Gordon L., 4,176,282, Cl. 260-590.00C.
Knight, John C.; and Wovcha, Merle G., 4,176,123, Cl. 260-345.200.
Nelson, Norman A., 4,176,236, Cl. 568-838.000.

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USM Corporation: *See—*
Benedetti, Nicholas M., 4,175,303, Cl. 24-73.0FT.

Utah Development Company: *See—*
Morrison, William R. B.; and Beale, Richard F., 4,175,430, Cl. 73-141.00A.

Uyetake, Tadao: *See—*
Wilger, John F.; Nakano, Gregory S.; Uyetake, Tadao; Orillo, Stephen, Jr.; and Higa, Teikichi, 4,175,471, Cl. 408-83.500.

Valiant, Edgar W., to Spraycool, Inc. Spray cooling system for gable roof. 4,175,703, Cl. 239-208.000.

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Peytavin, Pierre, 4,175,414, Cl. 72-96.000.

Valmet Oy: *See—*
Sailas, Vaino, 4,176,270, Cl. 219-121.0EM.

Vamvakas, Michael, to Niagara Bottle Washer Mfg. Company. Label accumulator and caustic separator. 4,176,067, Cl. 210-256.000.

Van Den Berk, Peter J. T.; and Verspui, Gerrit, to U.S. Philips Corporation. Lacquer-encapsulated carbon film resistor. 4,176,336, Cl. 338-274.000.

van der Lely, Cornelis. Soil cultivating implements. 4,175,623, Cl. 172-59.000.

van der Lely, Cornelis. Soil cultivating implement. 4,175,624, Cl. 172-59.000.

van der Zwart, Alfred J.: *See—*
Elenga, Cornelis W.; van Dijk, Pieter; and van der Zwart, Alfred J., 4,176,310, Cl. 323-7.000.

van Deventer, Jacobus P.: *See—*
Jordaan, Pieter J.; and van Deventer, Jacobus P., 4,175,943, Cl. 71-29.000.

van Dijk, Pieter: *See—*
Elenga, Cornelis W.; van Dijk, Pieter; and van der Zwart, Alfred J., 4,176,310, Cl. 323-7.000.

van Eijk, Johannes N., to Cindu Chemie B.V. Process for preparing binder pitches. 4,176,043, Cl. 208-44.000.

van Geffen, Johannes A., to Technisch Handels- en Adviesbureau van Geffen B.V. Methods and apparatuses for forming by frictional heat and pressure holes surrounded each by a boss in a metal plate or the wall of a metal tube. 4,175,413, Cl. 72-71.000.

Van Horbek, Judd. Hand mixing apparatus. 4,175,875, Cl. 366-343.000.

van Linden, Jacques, to Electrochemische Energieconversie, N.V. Battery unit, containing one or more fuel-cell blocks. 4,176,213, Cl. 429-12.000.

van Zeggelaar, Gerrit H.: *See—*
de Koning, Jan; and van Zeggelaar, Gerrit H., 4,175,342, Cl. 37-58.000.

Varian Associates, Inc.: *See—*
Boehme, Detlef R., 4,175,585, Cl. 137-509.000.
Giebeler, Robert H., 4,176,293, Cl. 313-343.000.

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Vaughn, Damon A.; and Hoffman, Herbert F. Sulky. 4,175,762, Cl. 280-78.000.

Vear, John P.: *See—*
Cornell, William F.; Vear, John P.; and Pascuzzi, E. Anthony, 4,175,691, Cl. 229-36.000.

Vecchietti, Vittorio: *See—*
Ferrari, Giorgio; and Vecchietti, Vittorio, 4,176,182, Cl. 424-248.500.

Verdier, Jean-Pierre: *See—*
Hoffmann, Jean-Claude; Castanie, Francis; Crabere, Henri; Verdier, Jean-Pierre; and Voisin, Norbert, 4,176,399, Cl. 364-717.000.

Vergnani, Leo H.; Ferrero, John B.; and Cassanelli, Ernest M. Workpiece forming machine. 4,175,417, Cl. 72-356.000.

Vernaleken, Hugo: *See—*
Bier, Peter; Binsack, Rudolf; and Vernaleken, Hugo, 4,176,224, Cl. 528-309.000.

Verspui, Gerrit: *See—*
Van Den Berk, Peter J. T.; and Verspui, Gerrit, 4,176,336, Cl. 338-274.000.

Vianova Kunstharz, A.G.: *See—*
Pampouchidis, Georgios; and Honig, Helmut, 4,176,099, Cl. 260-18.0TN.

Visky, Zsuzsa nee Gombos: *See—*
Szekely, Istvan; Tomoskozi, Istvan; Kovacs, Gabor; Simonidesz, Vilmos; Lovasz nee Gaspar, Marianna; Keresztes, Borbala nee Ordog; Remport, Julia nee Radoczi; Stadler, Istvan; Visky, Zsuzsa nee Gombos; and Szantay, Csaba, 4,176,122, Cl. 260-343.30P.

Visual Methods, Inc.: *See—*
Kruegle, Herman, 4,175,775, Cl. 283-7.000.

Vock, Manfred H.: *See—*
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick L.; and Vock, Manfred H., 4,175,569, Cl. 131-9.000.

Vockenhuber, Karl: *See—*
Kittag, Gerd, 4,175,840, Cl. 352-141.000.

Voisin, Norbert: *See—*
Hoffmann, Jean-Claude; Castanie, Francis; Crabere, Henri; Verdier, Jean-Pierre; and Voisin, Norbert, 4,176,399, Cl. 364-717.000.

Volgnandt, Peter: *See—*
Hempel, Hans-Ulrich; Klueppel, Hans-Jurgen; and Volgnandt, Peter, 4,176,127, Cl. 260-407.000.

Voll, Horst; Kessler, Franz; and Herla, Max, to Kugelfischer Georg Schafer & Co. Boring spindle with automatic tool liftoff. 4,175,802, Cl. 308-9.000.

Vollmer, Arthur N.; and Rainey, George E., to Sugardale Foods, Incorporated. Extraction of protein from edible beef bones and product. 4,176,199, Cl. 426-59.000.

Vollrath, Ulrich; and Leifeld, Ferdinand, to Trutzschler GmbH & Co. KG. Method and apparatus for feeding a carding group with pneumatic conveying system. 4,175,893, Cl. 406-52.000.

von Klinggraff, Gerhard; Marr, Peter; and Bohnes, Karlheinz, to Bochumer Eisenhutte Heintzmann GmbH & Co. Auxiliary walking mine support. 4,175,891, Cl. 405-291.000.

von Tomkewitsch, Romuald: *See—*
Schedele, Helmut; and von Tomkewitsch, Romuald, 4,176,241, Cl. 174-52.00S.

Vrzalik, John H.: *See—*
Leininger, James R.; and Vrzalik, John H., 4,175,550, Cl. 128-24.00R.

Vulis, Mikhail L.; Golenchenko, Valery A.; Rybin, Igor V.; and Shenderovich, Pavel B., to Gosudarstvenny Nauchno-Issledovatelsky Energeticheskiy Institut Imeni G.M. Krzhizhanovskogo (ENIN). Cooled multiphase ac cable. 4,176,238, Cl. 174-15.00S.

W. R. Grace & Co.: *See—*
Vaughan, David E. W.; Lussier, Roger J.; and Magee, John S., Jr., 4,176,090, Cl. 252-455.00Z.

W. Schlafhorst & Co.: *See—*
Derichs, Josef; and Koslowski, Gerhard, 4,175,718, Cl. 242-150.00R.
Kamp, Heinz, 4,175,711, Cl. 242-35.50A.

Wachter, Michael P.: *See—*
Kanojia, Ramesh M.; Wachter, Michael P.; and Chen, Robert H. K., 4,176,188, Cl. 424-270.000.

Wacker-Chemie GmbH: *See—*
Deubzer, Bernward; and Egerter, Norbert, 4,176,128, Cl. 260-448.20E.
John, Peter; Feichtner, Wolfgang; Graf, Werner; and Frey, Volker, 4,176,130, Cl. 260-448.20E.

Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH: *See—*
Zauhar, Helmut; Authier, Bernhard; Luptovits, Roland; and Schmidhammer, Leonhard, 4,175,610, Cl. 164-60.000.

Waehner, Glenn C., to United Technologies Corporation. Deflection waveform generator. 4,176,300, Cl. 315-371.000.

Wagenknecht, Conrad D.; and Faust, Guy K., to General Electric Company. Individual bypass injector valves for a double bypass variable cycle turbofan engine. 4,175,384, Cl. 60-226.00B.

Wagner, Sigurd: *See—*
Kasper, Horst M.; Tell, Benjamin; and Wagner, Sigurd, 4,176,170, Cl. 423-508.000.

Waldstein, David A. Monoalkanolamide borates, compositions containing the same, and the use thereof as rust-inhibitors and as synergistic lubricative-enhancive addenda. 4,176,076, Cl. 252-49.600.

Walker, Darrell W.: *See—*
Bertus, Brent J.; and Walker, Darrell W., 4,176,140, Cl. 585-629.000.

Walker, Derek: *See—*
Shih, Kun M.; and Walker, Derek, 4,176,131, Cl. 260-448.20E.

Wallace-Murray Corporation: *See—*
Hayman, Dennis J., 4,175,586, Cl. 137-614.110.

Wallick, Sherwin. Anti-syphon safety dispenser. 4,175,600, Cl. 141-363.000.

Walter, Kurt, to Hassia Verpackung GmbH. Process of producing a deep-drawn container. 4,175,995, Cl. 156-285.000.

Walters, Dean. Sewed seam ripper. 4,175,498, Cl. 112-129.000.

Walz, Gerd: *See—*
Kraft, Kurt; and Walz, Gerd, 4,176,143, Cl. 260-835.000.

Wang, Kenneth Y.: *See—*
Crawford, William B.; Daniel, Vernon T.; and Wang, Kenneth Y., 4,175,436, Cl. 73-338.600.

Ward, Arthur G. T.: *See—*
George, James S.; Ward, Arthur G. T.; and Pastakia, Percy N., 4,176,157, Cl. 422-114.000.

Ward, Danny W.: *See—*
Ward, Theodore W.; and Ward, Danny W., 4,176,260, Cl. 235-475.000.

Ward, Frederick D., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Guidance system using spring-stored energy. 4,175,451, Cl. 74-661.000.

Ward, Theodore W.; and Ward, Danny W. Inventory control system. 4,176,260, Cl. 235-475.000.

Waring, Wilson S., to Imperial Chemical Industries Limited. Oxyalkanoic acid derivatives. 4,176,194, Cl. 424-309.000.

Warner, John E.: *See—*
Tao, Fan-Sheng; and Warner, John E., 4,175,312, Cl. 29-428.000.

Warner-Lambert Company: *See—*
Tureaud, Kenneth E., 4,175,322, Cl. 433-171.000.

Warzel, Fred M., to Phillips Petroleum Company. Apparatus for feeding waste yarn to an extruder. 4,175,870, Cl. 366-76.000.

Washigawa, Yasuo: *See—*
Shinozaki, Fumiaki; Washigawa, Yasuo; Ikeda, Tomoaki; Nakao, Sho; and Kondoh, Syunichi, 4,175,971, Cl. 430-287.000.

Watanabe, Asao: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,175,851, Cl. 355-14.00R.

Watanabe, Minoru: *See—*
Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Ohno, Hideshi; and Natori, Minoru, 4,175,372, Cl. 58-5.000.

Watanabe, Yutaka, to Hitachi, Ltd. Error correction and detection systems. 4,175,692, Cl. 235-312.000.

Wayne, Robert J.; Chenausky, Peter P.; and Buczek, Carl J., to United Technologies Corporation. Method for cavity dumping a Q-switched laser. 4,176,327, Cl. 331-94.50M.

Weaver, Richard B.: *See—*
Koski, John A.; and Weaver, Richard B., 4,176,380, Cl. 360-50.000.

Webasto-Werk W. Baier GmbH & Co.: *See—*
Leiter, Robert, 4,175,785, Cl. 296-137.00E.
Schatzler, Walter; and Handler, Erich, 4,175,784, Cl. 296-137.00E.

Webb, Alan E.: *See—*
Crane, John L.; Archdale, Robert W.; and Webb, Alan E., 4,175,912, Cl. 416-193.00A.

Weber, Heinrich: *See—*
Husher, Lee K.; Weber, Heinrich; and Tippmer, Kurt, 4,176,062, Cl. 210-72.000.

Weber, James R.: *See—*
Davis, Billy J.; Kinsey, Cletus M.; Shen, Hwa J.; and Weber, James R., 4,175,799, Cl. 308-9.000.

Weber Marking Systems, Inc.: *See—*
Kenworthy, Grant F., 4,175,687, Cl. 226-74.000.

Weber Technical Products Division of Craig Systems Corp.: *See—*
Lough, Wendell J.; and Bishop, Donald E., 4,175,936, Cl. 55-385.00A.

Weiler, Gerhard H.; Nagel, Dieter H.; and Pagels, Louis T., to Automatic Liquid Packaging, Inc. Unitary, hermetically-sealed but pierceable dispensing container. 4,176,153, Cl. 264-524.000.

Weisenborn, Frank L.: *See—*
Ondetti, Miguel A.; and Weisenborn, Frank L., 4,176,235, Cl. 562-556.000.

Weiss, Charles M.: *See—*
Chiarenza, Angelo R.; and Weiss, Charles M., 4,175,565, Cl. 433-32.000.

Welker, Merrill, to Humphreys Engineering Company. Apparatus for distributing slurries. 4,175,591, Cl. 137-883.000.

Wendt, Hans: *See—*
Annen, Klaus; Laurent, Henry; Hofmeister, Helmut; Wiechert, Rudolf; Wendt, Hans; and Kapp, Joachim-Friedrich, 4,176,126, Cl. 260-397.450.

Wentworth, Robert S., Jr., to Borg-Warner Corporation. Mechanical seal. 4,175,753, Cl. 277-87.000.

Wenzl, Josef; and Meikis, Gunter, to Motoren- und Turbinen-Union Munchen GmbH. Temperature measuring probe. 4,175,438, Cl. 73-359.00R.

Wesenmeyer, Jurgen; Haubner, Georg; and Meier, Werner, to Robert Bosch GmbH. Method and apparatus to generate a trigger pulse within a time range, particularly ignition pulses in internal combustion engines. 4,175,508, Cl. 123-117.00R.

Wessler, Louis E.; and Koch, Kenneth F., to Xerox Corporation. Video input circuits for video hard copy controller. 4,176,379, Cl. 358-280.000.

West, Clarence W. Closed smoke generating apparatus. 4,176,082, Cl. 252-359.00A.

Western Electric Company, Inc.: *See—*
Lewis, Robert B.; and Giversen, Terri A., 4,176,142, Cl. 525-336.000.

Westinghouse Air Brake Company: *See—*
Clemmons, Quenten T., 4,175,793, Cl. 303-89.000.
Hart, James E., 4,175,792, Cl. 303-37.000.

Westinghouse Electric Corp.: *See—*
Bennon, Saul; and Albright, William D., 4,176,333, Cl. 336-60.000.
Chen, Cheng-Lin; and Chantry, Peter J., 4,176,025, Cl. 204-157.10R.
Chow, Kung C., 4,176,386, Cl. 361-93.000.
Driver, Michael C.; Oakes, James G.; and Davis, John R., 4,176,295, Cl. 315-39.000.
Garbuny, Max, 4,176,024, Cl. 204-157.10R.
Johnson, Joseph E.; and Dombrowski, Edward, 4,176,004, Cl. 156-643.000.
Kovatch, George N.; Rosey, Richard; and Simon, Ned H., 4,176,243, Cl. 174-72.00B.
McMillen, James W.; and Tomeo, Anthony, 4,176,262, Cl. 200-50.0AA.
Moeglich, Karl, 4,176,038, Cl. 204-277.000.
Schlegel, Earl S., 4,176,371, Cl. 357-38.000.
Thornton, William A., Jr., 4,176,294, Cl. 313-485.000.
Thornton, William A., Jr., 4,176,299, Cl. 315-326.000.

Wheatley, Robert T.; and Kosarek, Louis J., to El Paso Environmental Systems, Inc. Method and apparatus for recovering liquid and solid constituents of water solutions containing sparingly soluble solids. 4,176,057, Cl. 210-23.00H.

Wheeler, William R.: *See—*
Urbanek, Karel; Kren, George J.; and Wheeler, William R., 4,175,441, Cl. 73-599.000.

White, Anthony M., to Exxon Research & Engineering Co. Process for alkylating waxy hydrocarbons with C_3–C_5 carbon atom secondary alcohols as catalyst. 4,176,044, Cl. 208-46.000.

White Consolidated Industries, Inc.: *See—*
Loos, John H., 4,175,881, Cl. 403-13.000.

White, Gordon D., to Bullough Limited. Valve means for use in controlling operation of a hydraulic motor. 4,175,909, Cl. 415-145.000.

White, Larry J.: *See—*
Gotcher, Alan J.; Germeraad, Paul B.; and White, Larry J., 4,176,027, Cl. 204-159.150.

Whitehurst, Darrell D.: *See—*
Mitchell, Thomas O.; and Whitehurst, Darrell D., 4,176,161, Cl. 423-213.500.

Whitlock, Robert R. Method and apparatus for music instruction. 4,175,468, Cl. 84-485.0SR.

Whyte, David D.: *See—*
Guerry, Raymond E.; and Whyte, David D., 4,176,079, Cl. 252-90.000.

Wick, Arnold; and Jost, Max, to Ciba-Geigy Corporation. Process for dyeing polyesters in the melt. 4,176,113, Cl. 260-40.00P.

Wiechert, Rudolf: *See—*
Annen, Klaus; Laurent, Henry; Hofmeister, Helmut; Wiechert, Rudolf; Wendt, Hans; and Kapp, Joachim-Friedrich, 4,176,126, Cl. 260-397.450.

Wiener, Dieter. Dressing arrangement for grinding wheel of a gear form grinding machine. 4,175,537, Cl. 125-11.0CD.

Wiesboeck, Robert A., to United States Steel Corporation. Process and apparatus for producing and using cold ammonia. 4,175,394, Cl. 62-51.000.

Wilfong, William G.: *See—*
Becker, Michael L.; and Wilfong, William G., 4,175,364, Cl. 53-539.000.

Wilger, John F.; Nakano, Gregory S.; Uyetake, Tadao; Orillo, Stephen, Jr.; and Higa, Teikichi, to United States of America, Navy. Cutting apparatus and vertical drive mechanism therefor. 4,175,471, Cl. 408-83.500.

Wilhelm, William E., to Lockheed Corporation. Seal for fluid ducts. 4,175,754, Cl. 277-128.000.

Wilkinson, Peter R. S., to Wilkinson Photographic Products Limited. Photographic drum processor inserts. 4,175,849, Cl. 354-329.000.

Wilkinson Photographic Products Limited: *See—*
Wilkinson, Peter R. S., 4,175,849, Cl. 354-329.000.

Willhelm, Joerg: *See—*
Kaul, Dietmar; and Willhelm, Joerg, 4,176,276, Cl. 250-237.00G.

William H. Rorer, Inc.: *See—*
Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., 4,176,198, Cl. 424-330.000.

Williams, Alverson B.: *See—*
Milbreath, Herman C.; and Williams, Alverson B., 4,175,388, Cl. 60-337.000.

Williams, Benjamin C.: *See—*
Coldren, Daniel R.; Krider, Paul R.; and Williams, Benjamin C., 4,175,811, Cl. 339-19.000.

Williams, Stanley B. Device for aligning plates to be joined. 4,175,734, Cl. 269-49.000.

Wilmes, Manfred; Finger, Torsten; Fitzler, Arno; Kretzschmar, Wolfgang; and Franke, Heinrich, to C. A. Weidmuller KG. Modular housing means for electrical and electronic components. 4,175,820, Cl. 339-198.00R.

Wilmotte, Stephan H.: *See—*
Blondelot, Emile; Economopoulos, Marios; and Wilmotte, Stephan H., 4,175,985, Cl. 148-12.400.

Winans, Esther D.: *See—*
Ryer, Jack; Winans, Esther D.; Brois, Stanley J.; and Gutierre, Antonio, 4,176,073, Cl. 252-32.70E.

Winchell, Harry S.; Lin, Tz-Hong; and Panneciere, Charles A., to Medi-Physics, Inc. Radiographic compositions. 4,176,173, Cl. 424-5.000.

Windmoller & Holscher: *See—*
Achelpohl, Fritz; and Schneider, Horst, 4,176,000, Cl. 156-510.000.

Wing, James W., to International Business Machines Corporation. Printer cover assembly. 4,175,878, Cl. 400-693.000.

Winkler, Bruno. Process for shirring tubular films and product thereof. 4,176,204, Cl. 426-140.000.

Winn, Martin; and Kyncl, John J., to Abbott Laboratories. Aminomethylene oxindoles. 4,176,191, Cl. 424-274.000.

Winter, William E.; and Schuette, William L., to Exxon Research & Engineering Co. Catalytic cracking process. 4,176,049, Cl. 208-70.000.

Wintershall Aktiengesellschaft: *See—*
Dudek, Max; and Tieke, Otto, 4,176,010, Cl. 201-27.000.

Wirt, James R.: *See—*
MacWilliams, Dalton C.; and Wirt, James R., 4,175,975, Cl. 106-100.000.

Wirt, Leslie S., to Lockheed Corporation. Noise barrier. 4,175,639, Cl. 181-210.000.

Wise, Rodney M.; and Mitchell, Sharon J., to Procter & Gamble Company, The. Detergent compositions for effective oily soil removal. 4,176,080, Cl. 252-162.000.

Wismer, Joseph C. Electroplating rack. 4,176,039, Cl. 204-297.00W.

Wisotsky, Max J., to Exxon Research & Engineering Co. Polymer combination useful in fuel oil to improve cold flow properties. 4,175,926, Cl. 44-62.000.

Wittenbrink, Dieter: *See—*
Rapp, Heinz; Biedermann, Ernst; and Wittenbrink, Dieter, 4,175,857, Cl. 355-73.000.

Wittig, Curt; and Tiee, Joe J., to United States of America, Energy. CF_4 laser. 4,176,326, Cl. 331-94.50G.

Wojahn, Harold F. Quick smoker. 4,175,485, Cl. 99-482.000.

Wojciehowski, James P.; and Sullivan, John D., to Garrett Corporation, The. Aircraft spraying system and method. 4,175,701, Cl. 239-11.000.

Wood, Edward H. Tool changing apparatus. 4,175,898, Cl. 409-233.000.

Wood, Harry A.: *See—*
Henry, Robert J., 4,175,548, Cl. 128-24.00R.

Wood, Peter J., to Marconi Company Limited, The. Reflector antenna with matched feed system. 4,176,358, Cl. 343-782.000.

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Wright, Hal E.; and Berwick, Martin A., to Eastman Kodak Company. Multi-active photoconductive elements. 4,175,961, Cl. 430-58.000.

Wrinn, Joseph F., to Teradyne, Inc. Electrical circuitry for measuring low level signals. 4,176,312, Cl. 324-57.00N.

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Wu, Ching H.; Brown, Alfred; Hall, Wilbur L.; and Shupe, Russell D., to Texaco Inc. High vertical and horizontal conformance thermal oil recovery process. 4,175,618, Cl. 166-252.000.

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Karam, Ronald E.; and Swarthout, David J., 4,175,959, Cl. 430-134.000.
Loutfy, Rafik O.; McIntyre, Lloyd F.; and Sharp, James H., 4,175,981, Cl. 136-89.0SJ.
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Yamada, Toyohiko, to Shin-Shirasuna Electric Corp. Double integration method for measuring deviation of standard and reference analog quantities. 4,176,314, Cl. 324-140.00D.

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Yamanaka, Akira, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Truck with hydraulic means for absorbing impact energy. 4,175,634, Cl. 180-274.000.

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Yokoi, Gunpei, to Nintendo Co., Ltd. Shooting game device with projector and photoelectric detector. 4,175,748, Cl. 273-101.200.

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Yoo, Jin S.; and Milam, Ronald L., to Atlantic Richfield Company. Palladium-containing catalyst. 4,176,085, Cl. 252-428.000.

Yoshida, Akio; Tsubai, Yasuo; and Ebato, Seigo, to Mitsubishi Paper Mills, Ltd. Offset printing plate. 4,175,965, Cl. 430-230.000.

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Yoshioka, Nobuya, to Nippon Electric Co., Ltd. Magnetic bubble device. 4,176,405, Cl. 365-15.000.

Yoshizawa, Keiichi, to Kabushiki Kaisha Seikosha. Timepiece. 4,175,374, Cl. 58-23.00R.

Yu, Jing-Peir: *See*—
Bromley, James E.; and Yu, Jing-Peir, 4,176,150, Cl. 264-168.000.

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Zampaglione, Nicola: *See*—
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Zauhar, Helmut; Authier, Bernhard; Luptovits, Roland; and Schmidhammer, Leonhard, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Process and apparatus for the semicontinuous production of silicon moldings. 4,175,610, Cl. 164-60.000.

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Zellweger Uster AG: *See*—
Altenweger, Alois, 4,175,307, Cl. 28-211.000.

Zemsky, Michael D. Firearm and bullet identification. 4,175,346, Cl. 42-76.00R.

Zissel, Alfred: *See*—
Eckert, Guenter; Knaflic, France; Miller, Franz-Friedrich; and Zissel, Alfred, 4,175,922, Cl. 8-94.160.

Zoch, Harold L. Neutron absorbing room temperature vulcanizable silicone rubber compositions. 4,176,093, Cl. 252-478.000.

Zold, Tibor. Method and device for sorting particles suspended in an electrolyte. 4,175,662, Cl. 209-552.000.

Zrinscak, Sr. Fred S.: *See*—
McGovern, Stephen J.; Schatz, Klaus W.; and Zrinscak, Sr. Fred S., 4,176,083, Cl. 252-411.00R.

Zulberti, Carlos A. Cosmetics applicator device. 4,175,574, Cl. 132-88.700.

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TO WHOM

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Faitani, Joseph J.: *See*—
Emory, John M. G., Jr.; and Faitani, Joseph J., Re. 30,160, Cl. 60-39.650.

Gabor, Andrew, to Xerox Corporation. Apparatus measuring relative velocity of movable members including means to detect velocity from the position encoder. Re. 30,161, Cl. 318-616.000.

Kubler, Hermann, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. False twist-crimping machine. Re. 30,159, Cl. 57-291.000.

United Technologies Corporation: *See*—
Emory, John M. G., Jr.; and Faitani, Joseph J., Re. 30,160, Cl. 60-39.650.

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Beddome, Richard S.; and Myers, Dean, to Kimstock, Inc. Bathtub. 253,547, 11-27-79, Cl. D23-55.000.

Bellows, Reuben. Pin. 253,527, 11-27-79, Cl. D11-55.000.

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Bertani, Alberto. Handle. 253,513, 11-27-79, Cl. D8-307.000.

Blomqvist, Erik M., to AB Lyckeaborgs Bruk. Elastic frame for fire-proof feed-through of electric cables in walls of concrete or rock or the like. 253,554, 11-27-79, Cl. D25-90.000.

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English, Joseph R. Picture frame. 253,507, 11-27-79, Cl. D6-236.000.

Etelson, Doris C. Food container. 253,514, 11-27-79, Cl. D9-185.000.

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253	4,175,306

CLASS 28

211	4,175,307

CLASS 29

157.3 C	4,175,308
157.3 R	4,175,309
229	4,175,310
402.18	4,175,311
428	4,175,312
430	4,175,313
432.1	4,175,314
453	4,175,315
564.4	4,175,316
571	4,175,317
723	4,175,318
724	4,175,319
749	4,175,320

CLASS 30

276	4,175,321

CLASS 33

1 A	4,175,328
1 M	4,175,327
23 R	4,175,329
27 C	4,175,330
172 E	4,175,331
174 R	4,175,332
344	4,175,333

CLASS 34

5	4,175,334
128	4,175,335

CLASS 35

8 B	4,175,336
17	4,175,337
35 R	4,175,338
48 A	4,175,339
53	4,175,340

CLASS 37

2 R	4,175,341
58	4,175,342

CLASS 38

102.1	4,175,343

CLASS 40

364	4,175,344
473	4,175,345

CLASS 42

76 R	4,175,346

CLASS 43

6.5	4,175,347
17.6	4,175,348
42.02	4,175,349
82	4,175,350
90	4,175,351
139	4,175,352

CLASS 44

15 R	4,175,924
35	4,175,925
62	4,175,926
68	4,175,927

CLASS 46

227	4,175,353

CLASS 47

39	4,175,354
64	4,175,355
66	4,175,356

CLASS 48

197 R	4,175,928
202	4,175,929

CLASS 49

395	4,175,357

CLASS 51

142	4,175,358
170 MT	4,175,359
281 R	4,175,930
297	4,175,931

CLASS 52

28	4,175,360
66	4,175,361
274	4,175,362
294	4,175,363

CLASS 53

539	4,175,364

CLASS 55

59	4,175,932
259	4,175,933
267	4,175,934
269	4,175,935
385 A	4,175,936
419	4,175,937
440	4,175,938

CLASS 56

15.8	4,175,366
295	4,175,367
328 R	4,175,368
370	4,175,369

CLASS 57

263	4,175,370
291	Re.30,159
304	4,175,371

CLASS 58

5	4,175,372
16 D	4,175,373
23 BA	4,175,377
23 R	4,175,374
	4,175,375
	4,175,376

CLASS 59

16	4,175,379

CLASS 60

39.06	4,175,380
39.12	4,175,381
39.18 B	4,175,382
39.28 R	4,175,383
39.65	Re.30,160
226 B	4,175,384
230	4,175,385
276	4,175,386
290	4,175,387
337	4,175,388
414	4,175,389
527	4,175,390
531	4,175,391
561	4,175,392
671	4,175,393

CLASS 62

51	4,175,394
52	4,175,395
63	4,175,396
149	4,175,397
172	4,175,398
	4,175,399
174	4,175,400
180	4,175,401
263	4,175,402
324	4,175,403

CLASS 64

9 R	4,175,404
10	4,175,405
13	4,175,406
21	4,175,407
26	4,175,408

CLASS 65

2	4,175,939
4 A	4,175,940
60 B	4,175,941
	4,175,942

CLASS 68

4	4,175,409

CLASS 70

226	4,175,410

CLASS 71

29	4,175,943
39	4,175,944
78	4,175,945
87	4,175,946
88	4,175,947
96	4,175,948

CLASS 72

40	4,175,412
71	4,175,413
96	4,175,414
101	4,175,415
254	4,175,416
356	4,175,417
383	4,175,419
447	4,175,420

CLASS 73

3	4,175,421
23	4,175,422
30	4,175,423
49.2	4,175,424
59	4,175,425
61.4	4,175,426
118	4,175,427
141 A	4,175,428
	4,175,429
	4,175,430
161	4,175,431
170 A	4,175,432
196	4,175,433
197	4,175,434
313	4,175,435
338.6	4,175,436
342	4,175,418
359 R	4,175,438
362 AR	4,175,437
425.4 R	4,175,439
432 SD	4,175,440
599	4,175,441
627	4,175,442
722	4,175,443
738	4,175,444
768	4,175,445
787	4,175,446
799	4,175,447

CLASS 74

365	4,175,448
492	4,175,449
501 P	4,175,450
661	4,175,451

CLASS 75

42	4,175,949
53	4,175,950
91	4,175,951
101 R	4,175,952
134 F	4,175,953
138	4,175,954

CLASS 76

25 R	4,175,452

CLASS 81

57.38	4,175,453

CLASS 82

86	4,175,454

CLASS 83

110	4,175,455
176	4,175,456
230	4,175,457
268	4,175,458
315	4,175,459
856	4,175,460

CLASS 84

1.15	4,175,461
1.16	4,175,462
1.19	4,175,463
1.24	4,175,464
1.26	4,175,465
288	4,175,466
312 P	4,175,467
485 SR	4,175,468

CLASS 89

1 B	4,175,469
7	4,175,470

CLASS 91

6.5	4,175,472
443	4,175,473

CLASS 92

13.5	4,175,474
33	4,175,475

CLASS 93

1 E	4,175,476
36 A	4,175,477
62	4,175,478
77 FT	4,175,479

CLASS 98

37	4,175,480
50	4,175,481

CLASS 99

330	4,175,482
354	4,175,483
482	4,175,484
	4,175,485
483	4,175,486

CLASS 100

8	4,175,487

CLASS 101

99	4,175,488
366	4,175,489

CLASS 102

23	4,175,490
56 SC	4,175,491
92.6	4,175,492
93	4,175,493

CLASS 105

176	4,175,494
450	4,175,495

CLASS 106

58	4,175,974
100	4,175,975
162	4,175,976
272	4,175,977
281 R	4,175,978
309	4,175,979

CLASS 111

1	4,175,496

CLASS 112

79 R	4,175,497
129	4,175,498
165	4,175,499
166	4,175,500

CLASS 114

227	4,175,510

CLASS 115

35	4,175,511

CLASS 116

217	4,175,512

CLASS 119

5	4,175,513
14.08	4,175,514
16	4,175,515
62	4,175,516
155	4,175,517

CLASS 122

20 B	4,175,518
510	4,175,519

CLASS 123

30 D	4,175,501
41.35	4,175,502
41.72	4,175,503
52 M	4,175,504
90.3	4,175,505
117 A	4,175,520
117 D	4,175,506
	4,175,507
117 R	4,175,508
	4,175,509
119 A	4,175,522
	4,175,523
119 D	4,175,521
122 D	4,175,524
134	4,175,525
136	4,175,526
	4,175,527
139 AW	4,175,528
140 FG	4,175,530
140 R	4,175,529
191 S	4,175,531
	4,175,532
	4,175,533
198 F	4,175,534

CLASS 124

7	4,175,535
23 R	4,175,536

CLASS 125

11 CD	4,175,537

CLASS 126

85 B	4,175,538
121	4,175,539
425	4,175,540
429	4,175,541
449	4,175,542

CLASS 128

24 R	4,175,548
	4,175,549
	4,175,550
24.4	4,175,551
32	4,175,552
78	4,175,553
79	4,175,554
92 B	4,175,555
156	4,175,557
198	4,175,556
214 C	4,175,558
218 R	4,175,559
269	4,175,560
296	4,175,561
303 R	4,175,562
350 R	4,175,564
350 V	4,175,563
654	4,175,544
666	4,175,545
680	4,175,547
692	4,175,566
736	4,175,543
739	4,175,546
748	4,175,567

CLASS 130

27 T	4,175,568

CLASS 131

9	4,175,569
84 B	4,175,570
171 A	4,175,571

CLASS 132

7	4,175,572
73.6	4,175,573
88.7	4,175,574

CLASS 134

176	4,175,575

CLASS 135

1 A	4,175,576

CLASS 136

89 FC	4,175,980
89 SJ	4,175,981
	4,175,982

CLASS 137

15	4,175,577
67	4,175,578
119	4,175,579
315	4,175,580
319	4,175,581
334	4,175,582
504	4,175,583
	4,175,584
509	4,175,585
614.11	4,175,586
625.4	4,175,588
625.64	4,175,589
625.65	4,175,587
883	4,175,590
	4,175,591

CLASS 138

89	4,175,592
110	4,175,593

CLASS 139

436	4,175,594

CLASS 141

1	4,175,595
18	4,175,596
23	4,175,597
363	4,175,600

CLASS 144

34 E	4,175,598
175	4,175,599

CLASS 145

1 R	4,175,601

CLASS 148

1.5	4,175,983
9.5	4,175,984
12.4	4,175,985
16.5	4,175,986
36	4,175,987
189	4,175,988

CLASS 149

21	4,175,990

CLASS 150

3	4,175,602
4	4,175,603
15	4,175,604

CLASS 151

7	4,175,605

CLASS 152

399	4,175,606

CLASS 156

96	4,175,991
143	4,175,992
234	4,175,993
251	4,175,994
285	4,175,995
336	4,175,996
362	4,175,997
391	4,175,998
505	4,175,999
510	4,176,000
581	4,176,001
601	4,176,002
643	4,176,004

CLASS 160

1	4,175,607
273 R	4,175,608

CLASS 162

256	4,176,005

CLASS 164

60	4,175,609
	4,175,610
418	4,175,611
449	4,175,612

CLASS 165

1 4,175,613
95 4,175,614
106 4,175,615
107 D 4,175,616
122 4,175,617

CLASS 166

252 4,175,618
291 4,175,619
343 4,175,620

CLASS 171

14 4,175,621

CLASS 172

4,175,622
59 4,175,623
4,175,624
791 4,175,625

CLASS 174

15 S 4,176,238
23 C 4,176,239
4,176,240
52 H 4,176,242
52 S 4,176,241
72 B 4,176,243
88 C 4,176,244
92 4,176,245

CLASS 175

422 4,175,626

CLASS 178

22 4,176,246
4,176,247
67 4,176,248

CLASS 179

1 E 4,176,249
4,176,253
1 G 4,176,252
1 SW 4,176,251
1 VE 4,176,250
5 R 4,176,254
16 F 4,176,255
18 FG 4,176,256
98 4,176,257

CLASS 180

6.48 4,175,628
65 R 4,175,632
119 4,175,636
128 4,175,637
140 4,175,638
190 4,175,627
220 4,175,629
225 4,175,630
270 4,175,633
274 4,175,634
287 4,175,635
309 4,175,631

CLASS 181

210 4,175,639
213 4,175,640

CLASS 182

172 4,175,641

CLASS 184

1 E 4,175,642
11 A 4,175,643

CLASS 187

18 4,175,644

CLASS 188

72.1 4,175,645
156 4,175,646
274 4,175,647
344 4,175,648

CLASS 192

18 A 4,175,649
84 C 4,175,650
85 AB 4,175,651

CLASS 194

1 C 4,175,989

CLASS 198

332 4,175,652
4,175,653
398 4,175,654
403 4,175,655
748 4,175,656
833 4,175,657

CLASS 200

1 V 4,176,261
50 AA 4,176,262
60 4,176,263
82 E 4,176,264
316 4,176,265

CLASS 201

27 4,176,010
40 4,176,011

CLASS 202

172 4,176,012
242 4,176,013

CLASS 204

23 4,176,014
28 4,176,015
38 R 4,176,016
55 R 4,176,017
60 4,176,018
67 4,176,019
72 4,176,020
96 4,176,021
98 4,176,022
4,176,023
157.1 R 4,176,024
4,176,025
4,176,026
159.14 4,175,973
159.15 4,176,027
159.16 4,176,028
159.18 4,175,972
192 R 4,176,030
192 S 4,176,029
195 P 4,176,032
195 R 4,176,031
197 4,176,033
200 4,176,034
205 4,176,035
224 R 4,176,036
243 M 4,176,037
277 4,176,038
297 W 4,176,039

CLASS 206

221 4,175,658
223 4,175,659
468 4,175,660
519 4,175,661

CLASS 208

8 LE 4,176,040
10 4,176,041
11 LE 4,176,042
44 4,176,043
46 4,176,044
48 R 4,176,045
50 4,176,046
51 4,176,047
59 4,176,048
70 4,176,049
111 4,176,050
112 4,176,051
131 4,176,052
310 Z 4,176,053

CLASS 209

8 4,176,054
152 4,176,055
552 4,175,662
610 4,175,663
657 4,175,664

CLASS 210

20 4,176,056
23 H 4,176,057
44 4,176,058
58 4,176,059
62 4,176,060
63 Z 4,176,061
72 4,176,062
101 4,176,063
196 4,176,064
223 4,176,065
241 4,176,066
256 4,176,067
295 4,176,068
321 B 4,176,069
500 M 4,176,070

CLASS 211

49 D 4,175,665
71 4,175,666

CLASS 213

40 R 4,175,667

CLASS 215

354 4,175,668

CLASS 219

10.55 A 4,176,267
4,176,268
10.55 F 4,176,266
60 A 4,176,269
121 EM 4,176,270
4,176,271
216 4,176,272
220 4,176,273
522 4,176,274

CLASS 220

5 A 4,175,669
70 4,175,670
235 4,175,671
334 4,175,672

CLASS 221

63 4,175,673
72 4,175,675
88 4,175,674
211 4,175,676

CLASS 222

5 4,175,677
54 4,175,678
70 4,175,679
465 4,175,680

CLASS 223

2 4,175,681

CLASS 224

45 S 4,175,683
309 4,175,682

CLASS 225

2 4,175,684
19 4,175,685
97 4,175,686

CLASS 226

74 4,175,687
158 4,175,688
190 4,175,689

CLASS 227

76 4,175,690

CLASS 229

36 4,175,691

CLASS 235

302 4,176,258
312 4,175,692
449 4,176,259
463 4,175,693
475 4,175,694
4,176,260

CLASS 236

1 G 4,175,695
34.5 4,175,696
93 A 4,175,697

CLASS 237

19 4,175,698
55 4,175,699

CLASS 238

299 4,175,700

CLASS 239

11 4,175,701
113 4,175,702
208 4,175,703
320 4,175,704
414 4,175,706
456 4,175,707
651 4,175,705

CLASS 241

16 4,175,708
21 4,175,709
46 R 4,175,814
55 4,175,710

CLASS 242

35.5 A 4,175,711
46.4 4,175,712
56 R 4,175,713
65 4,175,714
72.1 4,175,715
84.2 A 4,175,716
131 4,175,717
150 R 4,175,718
197 4,175,719

CLASS 244

3.28 4,175,720
83 F 4,175,721
152 4,175,722
162 4,175,723

CLASS 248

642 4,175,724

CLASS 249

81 4,175,725

CLASS 250

213 R 4,176,275
237 G 4,176,276
316.1 4,176,277
439 P 4,176,278
445 T 4,176,279
4,176,280
492 A 4,176,281

CLASS 251

315 4,175,726

CLASS 252

8.1 4,176,071
32.7 E 4,176,072
4,176,073
4,176,074
42.1 4,176,075
49.6 4,176,076
51.5 R 4,176,077
90 4,176,079
162 4,176,080
182 4,176,081
359 A 4,176,082
411 R 4,176,083
417 4,176,084
428 4,176,085
429 B 4,176,086
439 4,176,087
441 4,176,088
452 4,176,089
455 Z 4,176,090
456 4,176,091
472 4,176,092
478 4,176,093
518 4,176,094

CLASS 254

173 R 4,175,727

CLASS 260

9 4,176,095
15 4,176,096
17.4 BB 4,176,097
18 R 4,176,098
18 TN 4,176,099
22 R 4,176,100
22 T 4,176,101
28.5 AS 4,176,102
28.5 R 4,176,104
29.3 4,176,105
4,176,106
29.6 E 4,176,107
29.6 RW 4,176,103
29.6 TA 4,176,108
31.2 MR 4,176,109
31.8 N 4,176,110
37 SB 4,176,111
4,176,112
39 R 4,176,115
40 P 4,176,113
42.29 4,176,114
112.5 R 4,176,116
118 4,176,117
239 A 4,176,118
243.3 4,176,119
343.3 P 4,176,122
345.2 4,176,123
346.3 4,176,124
369 4,176,125
397.45 4,176,126
407 4,176,127
448 R 4,176,129
448.2 E 4,176,128
4,176,130
4,176,131
453 A 4,176,132
465.5 R 4,176,133
543 R 4,176,134
554 4,176,135
561 N 4,176,137
561 R 4,176,136
575 4,176,138
586 C 4,176,139
590 C 4,176,282
835 4,176,143

CLASS 264

25 4,176,147
41 4,176,148
146 4,176,149
168 4,176,150
291 4,176,151
329 4,176,152
524 4,176,153
547 4,176,154
564 4,176,155

CLASS 266

51 4,175,729
120 4,175,730
142 4,175,731
213 4,175,732

CLASS 267

126 4,175,733

CLASS 269

49 4,175,734
4,175,735
88 4,175,736
91 4,175,728
317 4,175,737

CLASS 270

30 4,175,738
58 4,175,739
83 4,175,740

CLASS 271

3.1 4,175,741

CLASS 273

1 E 4,175,743
1 R 4,175,742
26 E 4,175,744
73 C 4,175,745
85 R 4,175,746
101.2 4,175,747
4,175,748
106.5 B 4,175,749
157 R 4,175,750

CLASS 274

13 R 4,175,751

CLASS 277

53 4,175,752
87 4,175,753
128 4,175,754
137 4,175,755
189 4,175,756
212 F 4,175,757
220 4,175,758

CLASS 280

16 4,175,759
4,175,760
47.18 4,175,761
78 4,175,762
104 4,175,763
284 4,175,764
460 A 4,175,765
608 4,175,766
610 4,175,767
652 4,175,768
654 4,175,769
668 4,175,770
696 4,175,771
718 4,175,772
803 4,175,773

CLASS 283

6 4,175,774
7 4,175,775
8 B 4,175,776
42 4,175,777

CLASS 285

3 4,175,778
115 4,175,779

CLASS 290

52 4,176,283

CLASS 292

201 4,175,780
218 4,175,781
307 R 4,175,782

CLASS 296

20 4,175,783
137 E 4,175,784
4,175,785

CLASS 297

254 4,175,786
484 4,175,787

CLASS 299

1 4,175,788
4 4,175,789
7 4,175,790

CLASS 303

24 A 4,175,791
37 4,175,792
89 4,175,793
105 4,175,794
118 4,175,795

CLASS 305

11 4,175,796
53 4,175,797
58 R 4,175,798

CLASS 307

10 BP 4,176,284
106 4,176,285
237 4,176,286
251 4,176,287
252 A 4,176,288
270 4,176,289
306 4,176,290

CLASS 308

9 4,175,799
4,175,800
4,175,802
4,175,803
23 4,175,801
26 4,175,804
199 4,175,805
238 4,175,806

CLASS 310

52 4,176,291
4,176,292

CLASS 312

118 4,175,807

CLASS 313

343 4,176,293
485 4,176,294

CLASS 315

39 4,176,295
71 4,176,296
150 4,176,297
169.2 4,176,298
326 4,176,299
371 4,176,300
384 4,176,301
397 4,176,302
400 4,176,303
411 4,176,304

CLASS 316

19 4,175,808

CLASS 318

616 Re.30,161
653 4,176,305
772 4,176,306
798 4,176,307

CLASS 323

4 4,176,308
4,176,309
7 4,176,310

CLASS 324

57 N 4,176,312
62 4,176,313
140 D 4,176,314
156 4,176,315
468 4,176,311

CLASS 325

32 4,176,316
62 4,176,317
133 4,176,318
138 4,176,319
308 4,176,320
325 4,176,321
369 4,176,322

CLASS 330

263 4,176,323

CLASS 331

94.5 G 4,176,326
94.5 H 4,176,325
94.5 M 4,176,327
94.5 T 4,176,324

CLASS 332

16 T 4,176,328

CLASS 333

28 T 4,176,329
122 4,176,330
213 4,176,331
218 4,176,332

CLASS 336

60 4,176,333
84 C 4,176,334
180 4,176,335

CLASS 338

274 4,176,336

CLASS 339

1 L 4,175,809
17 C 4,175,810
19 4,175,811
29 R 4,175,812
36 4,175,813
61 R 4,175,815
95 R 4,175,816
111 4,175,817
176 M 4,175,819
176 MP 4,175,818
198 R 4,175,820
258 R 4,175,821
266 R 4,175,822

CLASS 340

52 H 4,176,340
147 LP 4,176,341
166 R 4,176,342
286 R 4,176,343
347 DA 4,176,344
373 4,176,345
524 4,176,346
545 4,176,347
562 4,176,348
613 4,176,349
644 4,176,350

CLASS 343

9 R 4,176,351
4,176,352
12 A 4,176,353

17.7 4,176,354
18 C 4,176,355
100 CS 4,176,356
112 R 4,176,357
782 4,176,358
854 4,176,359
883 4,176,360

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54 : 4,175,481
55 : 4,175,316
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56 : 4,175,333
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DESIGN PATENTS

6 : 253,527
9 : 253,549
06 : 253,498
253,510
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253,541
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253,547

08 : 253,525
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09 : 253,537
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12 : 253,555
13 : 253,507
253,552
17 : 253,518

19 : 253,520
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23 : 253,506
25 : 253,526
26 : 253,511
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27 : 253,505

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29 : 253,519
33 : 253,534
34 : 253,515
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253,528
36 : 253,497

253,502
253,503
253,509
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253,540
253,548
253,551

40 : 253,535
42 : 253,508
253,532
47 : 253,496
253,543
50 : 253,500
55 : 253,550
56 : 253,538

PLANT PATENTS

06 : 4,490

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